EXHIBIT 5

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
CHARLESTON DIVISION

IN RE: ETHICON, INC., PELVIC REPAIR SYSTEM PRODUCTS LIABILITY LITIGATION — **MDL No. 2327**

THIS DOCUMENT RELATES TO ALL WAVE ONE CASES INVOLVING THE PROLIFT LINE OF PRODUCTS

RULE 26 EXPERT REPORT OF DR. ABBAS SHOBEIRI

The following report is provided pursuant to Rule 26 of the Federal Rules of Civil Procedure. All of the opinions that I offer in this Report I hold to reasonable degree of medical or scientific certainty.

I. QUALIFICATIONS

Currently, I am a Professor of Obstetrics and Gynecology, Virginia Commonwealth University School of Medicine & George Washington University, Professor, Cell Biology & Anatomy, Graduate College, OUHSC, and Vice Chair, Gynecologic Subspecialties, Inova Fairfax Hospital Women's Center. Previously, I was Professor and Section Chief of Female Pelvic Medicine & Reconstructive Surgery at the University of Oklahoma Health Sciences Center. I am also a Professor of Cell Biology and Anatomy at the OUHSC.

I was recruited to the University of Oklahoma Health Sciences Center in 2002 as the first fellowship trained physician in Female Pelvic Medicine and Reconstructive Surgery in Oklahoma. Prior to settling in Oklahoma, I obtained my Bachelor degree from the University of Washington in Seattle, Medical Degree from Tufts University in Boston,

and completed my residency and fellowship at Tulane and Louisiana State University in New Orleans. My CV is attached as Exhibit A.

I established the OU Pelvic and Bladder Health Center which now encompasses an ACGME accredited 3 year fellowship program, an International Continence Society and International Urogynecology Association host site for research scholar program, Pelvic Floor Investigation Group (PFIG), OU Basic Science Pelvic Floor Laboratory, and OU International Ultrasound workshop. I have been the recipient of research and educational awards. I have been a grant reviewer for the American College of Obstetrics and Gynecology, the American Urogynecologic Society, and American Federation for Aging Research. I am also a manuscript reviewer for Urology, Journal of Urogynecology & Pelvic Floor Dysfunction, American Journal of Obstetrics and Gynecology, Neurourology & Urodynamics, and Journal of Pelvic Medicine and Surgery. I have authored numerous articles in scientific journals as well as several chapters for textbooks standard to the field of Urogynecology. I am the editor of the textbook entitled: Practical Pelvic Floor Ultrasonography.

I have chaired ultrasound workshops at the International Continence Society, International Urogynecology Association, and multiple institutions around the world. Additionally, I have served on the Research and the Program committees at the American Urogynecologic Society.

My clinical interests include vaginal agenesis and structural abnormalities. My research interests include basic science neuroanatomy and the study of pelvic floor injury using 3D sonography. These include the evaluation and treatment of mesh-related complications.

II. BACKGROUND

The opinions expressed on this report are based on the peer-reviewed medical literature, as well as my experience as an academic urogynecologist with a busy clinical practice. As an academic urpogynecologist, I receive referrals from around the country for mesh-related complications. Patients with mesh-related complications are commonly referred to a tertiary care center for evaluation and treatment because the expertise for repair of these problems requires advanced training. In my current role as I am actively involved in patient care, teaching, and research.

In addition to my clinical practice treating pelvic organ prolapse and stress urinary incontinence and managing surgical complications, I have special expertise in the imaging of mesh with ultrasound technology. I am recognized as one of the world's experts in this area and have published widely in this area. This expertise provides me with a unique opportunity to visualize the behavior of mesh in vivo and correlate those findings with patient symptoms.

Numerous materials, biologic and synthetic, have been used to treat pelvic organ prolapse (POP) and stress urinary incontinence (SUI). Three-dimensional ultrasound has been shown to be the most effective technique to image these implantable materials. X-ray, CT scan, MRI are not capable of visualizing mesh, however 3D ultrasound rays bounce off the mesh material and make the mesh easily visible.

I pioneered a technique for the optimal visualization of pelvic floor imaging of pelvic floor structures, including meshes and implants. The procedure used to obtain these images is similar to the traditional endovaginal sonogram, but the images are obtained using a side fire rather than an end fire transducer. The 3D volumes obtained by

BK transducer allows for optimal imaging of the vaginal wall, urethra, and anal canal. All images are obtained with a BK Medical 8838 high resolution, 6-12 MHz, 360° rotational transducer. The 8838 has a 65mm X 5.5mm acoustic footprint and penetration depth of up to 85mm. This transducer is similar in size and shape to the traditional end-fire transducer used in gynecological imaging. Pressing the 3D acquisition button moves the internal probe crystals to obtain images every 0.5 degrees for 360 degrees. The images are packaged into a 3D volume that can be manipulated in any plane. The 3D ultrasound imaging takes 30 seconds and minimizes patient discomfort. 2D Ultrasonography is typically operator dependent. 3D imaging allows for an automated acquisition. This reduces operator dependence; the data set is stored and can later be manipulated and analyzed. This methodology has been published and is now widely accepted by the medical community.

I am familiar with the Ethicon Prolift products, specifically, in addition to my knowledge relating to mesh products generally. I have personally managed patients with complications related to these devices and have removed Prolift mesh devices from patients referred to our center. Although approached by Ethicon as a “key opinion leader”, I declined to continue using the Prolift devices because of the high rates and severity of complications seen in my practice, discussed at meetings with academic colleagues, and reported in the medical literature with prolapse mesh “kits”. I have had my own patient who developed pudendal neuralgia after a posterior Prolift. Fortunately, I was proactive and after immediate removal of the Prolift, the pain resolved slowly.

IV. SUMMARY OF OPINIONS

1. Complications resulting from prolapse mesh "kits" like the Prolift products are unlike those seen with other pelvic surgery in terms of onset, frequency, severity, character, and responsiveness to treatment.
2. Three-dimensional endovaginal ultrasound (EVUS) is a reliable, reproducible, and well-accepted method for assessing pelvic floor conditions, including mesh complications.
3. Mesh complications, including those resulting from the Prolift devices, are associated with distinct findings on EVUS.
4. Mesh findings on EVUS include deformation (bunching, folding, corrugation, curling, coiling, etc.), shrinkage and contraction, fragmentation, migration, and residual mesh.
5. Mesh contraction (defined by IUGA/ICS as shrinkage or reduction in size) is a well-known and well-accepted occurrence, can be detected by EVUS, and has clinical consequences.
6. The lateral arms of the Prolift devices are difficult, if not impossible to remove, even with the aid of advanced imaging and surgical skill, and result in significant morbidity for patients.
7. The Prolift devices are associated with an unacceptably high rate of complications, including erosion, chronic pain, vaginal scarring and distortion, and bladder, bowel, and sexual impairment.
8. EVUS evaluation combined with physical examination provides objective evidence of the mechanism and cause of mesh-related symptoms.

9. In a woman presenting with vaginal pain and sexual pain following a Prolift procedure, a mesh-related condition attributable to the mesh product is the most likely diagnosis on the list of differential diagnoses.
10. In a woman presenting with vaginal pain and sexual pain following a Prolift procedure, these symptoms are, more likely than not, associated with the properties of mesh described in this report.
11. The surgical management of mesh complications requires advanced training and specialized expertise.
12. Timely recognition and referral of mesh complications is of utmost importance to prevent prolonged suffering of patients.
13. Most patients with mesh complications are referred for treatment by someone other than the implanting doctor. This indicates that complications are under-appreciated by community doctors and often results in a delay of appropriate treatment.
14. The Prolift devices are defectively designed as described in the body of this report.
15. Ethicon did not adequately warn physicians and patients about known complications and risks associated with its Prolift devices.
16. There are safer alternatives to the Prolift devics that have equivalent or superior efficacy.
17. Because of the rate and severity of complications and the lack of improved efficacy over other surgical procedures to treat pelvic organ prolapse, the risks of the Prolift devices outweigh their benefits and should not be used.

III. THE METHOD OF INSERTION FOR PROLIFT

My knowledge of the Prolift products as well as my review of Ethicon's Instructions for Use and insertion video provide the basis for this brief review of the method of insertion of the Prolift devices. These devices require transvaginal implantation of a pre-cut piece of polypropylene mesh using specially designed trocars. The Prolift anterior and posterior products are comprised of a central mesh portion and four flat mesh arms.

The images below from the original Prolift IFU depict the devices and the insertion methods. A document that I had in my possession describing the Surgical Technique involved in the Prolift procedures is also attached to this report. This is a complex operation even for experienced pelvic floor surgeons and should not be considered "minimally invasive." This is also borne out in the peer-reviewed medical literature.[1]

[1] D. Altman and C. Falconer, "Intra and Perioperative Morbidity Using Transvaginal Mesh in Pelvic Organ Prolapse Repair," *Obstet Gynecol* 109, no. 2 Pt 1 (2007).

ENGLISH

Gynecare

PROLIFT*

Total Pelvic Floor Repair System
Anterior Pelvic Floor Repair System
Posterior Pelvic Floor Repair System

Please read all information carefully.
Failure to properly follow instructions may result in improper functioning of the devices and lead to injury.

CAUTION: Federal (USA) law restricts this device to sale by or on the order of a physician.

Training on the use of the GYNECARE PROLIFT* Pelvic Floor Repair Systems is recommended and available. Contact your company sales representative to arrange for this training.

Refer to the recommended surgical technique for the GYNECARE PROLIFT Pelvic Floor Repair Systems for further information on the GYNECARE PROLIFT procedures.

INDICATIONS

The GYNECARE PROLIFT Total, Anterior, and Posterior Pelvic Floor Repair Systems are indicated for tissue reinforcement and long-lasting stabilization of fascial structures of the pelvic floor in vaginal wall prolapse where surgical treatment is intended, either as mechanical support or bridging material for the fascial defect.

DESCRIPTION

The GYNECARE PROLIFT Total, Anterior, and Posterior Pelvic Floor Repair Systems consist of pre-cut GYNECARE GYNEMESH* PS Nonabsorbable PROLENE* Soft Mesh implants and a set of instruments to facilitate mesh implant placement. The following table summarizes the instruments included with each system:

REPAIR SYSTEM	COMPONENTS			
	Mesh Implant	Guide	Retrieval Devices	Cannulas
Total	1 Total	1	6	6
Anterior	1 Anterior	1	4	4
Posterior	1 Posterior	1	2	2

Table 1 – GYNECARE PROLIFT Pelvic Floor Repair System Components

GYNECARE GYNEMESH PS

GYNECARE GYNEMESH PS is mesh constructed of knitted filaments of extruded polypropylene identical in composition to PROLENE Polypropylene Suture, Nonabsorbable Surgical Sutures, U.S.P. (ETHICON, INC.). This material, when used as a suture, has been reported to be non-reactive and to retain its strength indefinitely in clinical use. The mesh affords excellent strength, durability, and surgical adaptability, with sufficient porosity for necessary tissue ingrowth. Blue PROLENE monofilaments have been incorporated to produce contrast striping in the mesh. The mesh is constructed of reduced diameter monofilament fibers, knitted into a unique design that results in a mesh that is approximately 50 percent more flexible than standard PROLENE mesh. The mesh is knitted by a process which interlinks each fiber junction and which provides for elasticity in both directions. This construction permits the mesh to be cut into any desired shape or size without unraveling. The bi-directional elastic property allows adaptation to various stresses encountered in the body.

Total Mesh Implant

The Total mesh implant is constructed from GYNECARE GYNEMESH PS and is shaped for performing a total vaginal repair. The implant has 6 straps: 4 for securing the anterior portion of the implant via a transobturator approach and two for securing the posterior portion of the implant in the sacrospinous ligament via a transgluteal approach. Alternatively, the 2 posterior straps may be cut to reduce their length and secured in the sacrospinous ligament via a vaginal approach. The proximal and distal anterior straps have squared and triangular ends, respectively, while the posterior straps have rounded ends *(see Figure 1)*.

Anterior Mesh Implant

The Anterior mesh implant is constructed from GYNECARE GYNEMESH PS and is shaped for repair of anterior vaginal defects. The implant has 4 straps that are secured via a transobturator approach. The proximal and distal anterior straps have squared and triangular ends, respectively *(see Figure 1)*.

Posterior Mesh Implant
The Posterior mesh implant is constructed from GYNECARE GYNEMESH PS and is shaped for repair of posterior and/or apical vaginal vault defects. The implant has 2 straps that are secured in the sacrospinous ligament via a transgluteal approach. Alternatively, the 2 posterior straps may be cut to reduce their length and secured in the sacrospinous ligament via a vaginal approach. The posterior straps have rounded ends *(see Figure 1)*.

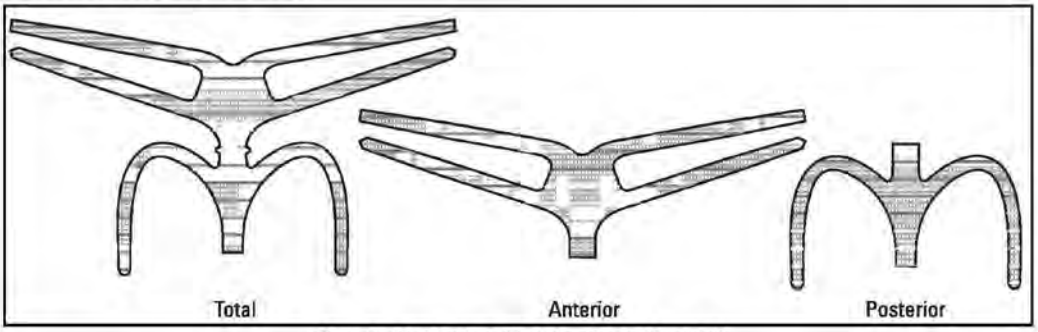


Figure 1 – Mesh Implants (Total, Anterior, and Posterior)

GYNECARE PROLIFT Guide
The GYNECARE PROLIFT Guide is a single-patient-use instrument designed to create tissue paths to allow placement of the Total, Anterior, and Posterior mesh implants and to facilitate placement of the GYNECARE PROLIFT Cannula. Its length and curvature are specifically designed to create proper placement paths for all mesh implant straps. The GYNECARE PROLIFT Guide is suitable for use on both sides of the patient *(see Figure 2)*.

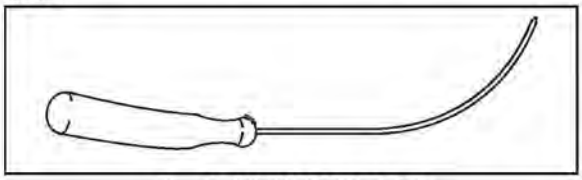


Figure 2 – GYNECARE PROLIFT Guide

GYNECARE PROLIFT Cannula
The GYNECARE PROLIFT Cannula is a single-patient-use instrument used in conjunction with the GYNECARE PROLIFT Guide to facilitate passage of the implant straps while protecting the surrounding tissue. Each GYNECARE PROLIFT Cannula is placed over the GYNECARE PROLIFT Guide prior to passage and remains in place after the GYNECARE PROLIFT Guide is withdrawn *(see Figure 3)*.

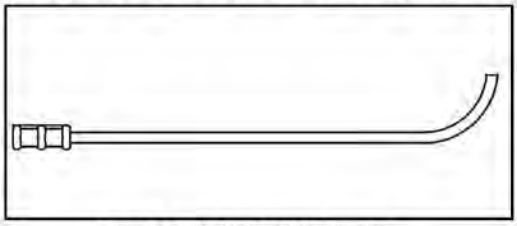


Figure 3 – GYNECARE PROLIFT Cannula

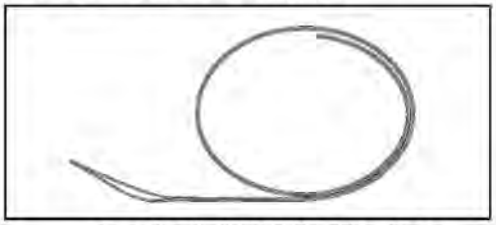


Figure 4 – GYNECARE PROLIFT Retrieval Device

GYNECARE PROLIFT Retrieval Device
The GYNECARE PROLIFT Retrieval Device is a single-patient-use instrument designed to facilitate placement of the mesh implant straps. The GYNECARE PROLIFT Retrieval Device is passed through the previously positioned GYNECARE PROLIFT Cannula until its distal end is retrieved through the vaginal dissection. The distal end of the GYNECARE PROLIFT Retrieval Device has a loop to securely capture the mesh implant strap as the strap is drawn out through the GYNECARE PROLIFT Cannula *(see Figure 4)*.

3

INSTRUCTIONS FOR USE

NOTE: All figures below are not intended to provide any clinical teaching and only demonstrate the general use of each device.

Placement of the the GYNECARE PROLIFT Cannula onto the GYNECARE PROLIFT Guide *(See Figures 5A and 5B)*

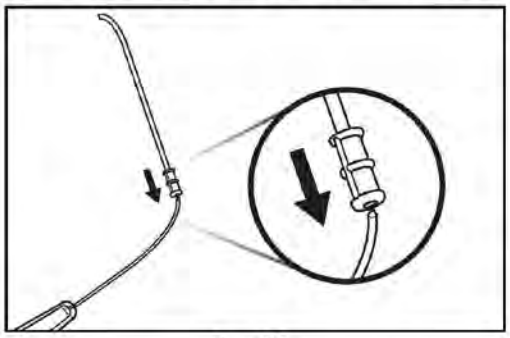


Figure 5A

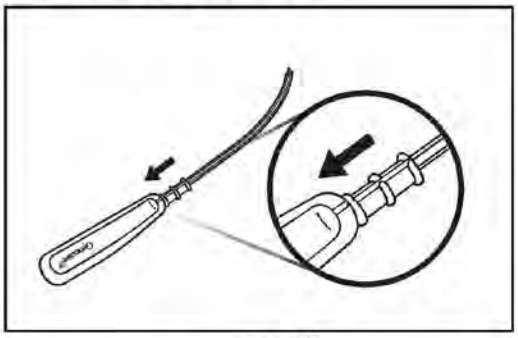


Figure 5B

IMPORTANT: Ensure proper alignment of GYNECARE PROLIFT Cannula and GYNECARE PROLIFT Guide upon assembly as demonstrated in *Figure 5B*.

Placement of the GYNECARE PROLIFT Cannula into the Patient *(See Figures 6A , 6B and 6C)*

Figure 6A

Figure 6B

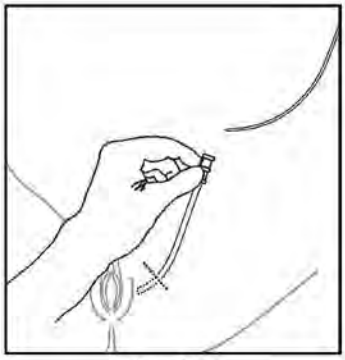


Figure 6C

Insertion and Passage of the GYNECARE PROLIFT Retrieval Device into the GYNECARE PROLIFT Cannula *(See Figures 7A and 7B)*

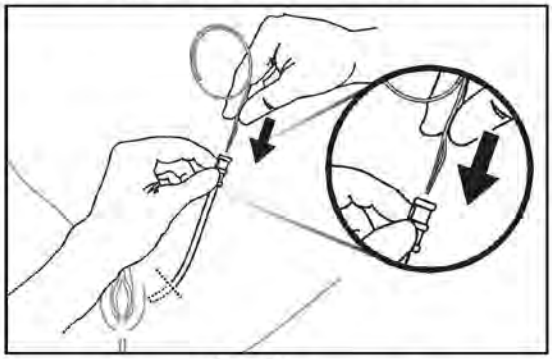


Figure 7A

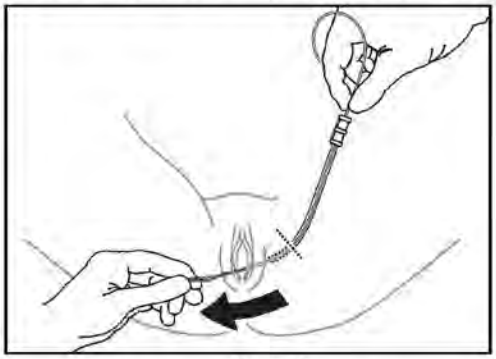


Figure 7B

IMPORTANT: All provided GYNECARE PROLIFT Cannulas and GYNECARE PROLIFT Retrieval Devices should be placed prior to mesh implant installation.

Capture of a Mesh Implant Strap with GYNECARE PROLIFT Retrieval Device *(See Figures 8A , 8B and 8C)*

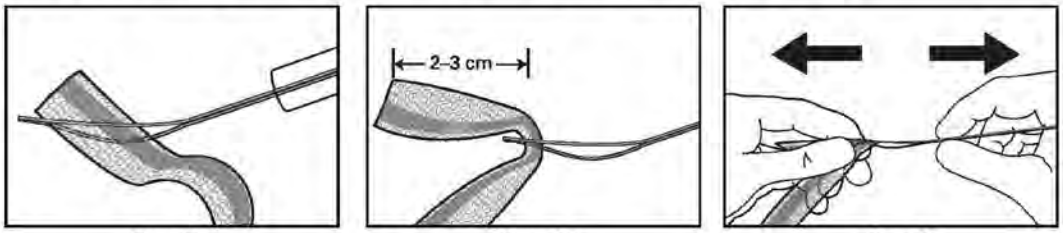


Figure 8A *Figure 8B* *Figure 8C*

Passage of a Mesh Implant Strap through the GYNECARE PROLIFT Cannula *(See Figures 9A , 9B and 9C)*

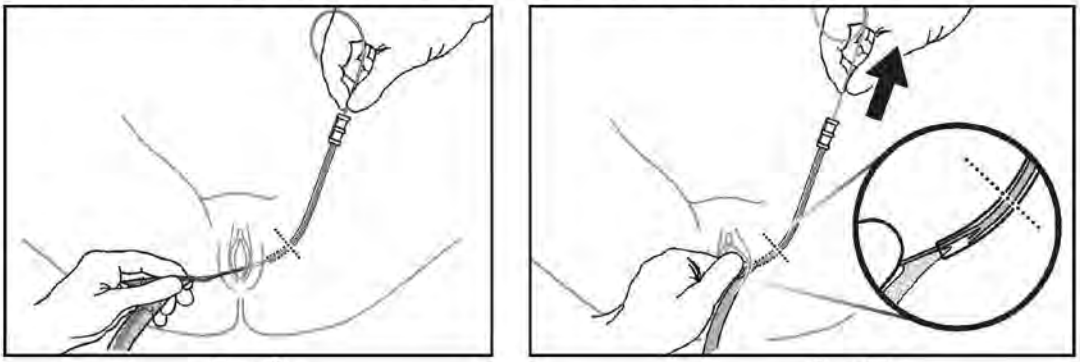


Figure 9A *Figure 9B*

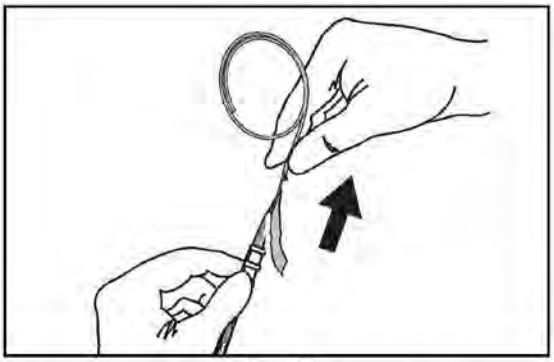


Figure 9C

IMPORTANT: Do not remove the GYNECARE PROLIFT Cannulas from the patient until the mesh implant has been properly positioned.

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

PERFORMANCE

Animal studies show that implantation of GYNECARE GYNEMESH PS mesh elicits a minimum to slight inflammatory reaction, which is transient and is followed by the deposition of a thin fibrous layer of tissue which can grow through the interstices of the mesh, thus incorporating the mesh into adjacent tissue. The mesh remains soft and pliable, and normal wound healing is not noticeably impaired. The material is not absorbed, nor is it subject to degradation or weakening by the action of tissue enzymes.

CONTRAINDICATIONS

When GYNECARE GYNEMESH PS mesh is used in infants, children, pregnant women, or women planning future pregnancies, the surgeon should be aware that this product will not stretch significantly as the patient grows.

WARNINGS AND PRECAUTIONS

- Users should be familiar with surgical procedures and techniques involving pelvic floor repair and nonabsorbable meshes before employing the GYNECARE PROLIFT Pelvic Floor Repair Systems.
- Acceptable surgical practices should be followed in the presence of infected or contaminated wounds.
- Post-operatively the patient should be advised to refrain from intercourse, heavy lifting and/or exercise (e.g. cycling, jogging) until the physician determines when it is suitable for the patient to return to her normal activities.
- Avoid placing excessive tension on the mesh implant during handling.
- Refer to the recommended surgical technique for the GYNECARE PROLIFT Pelvic Floor Repair System for further information on the GYNECARE PROLIFT procedures.
- The GYNECARE PROLIFT Pelvic Floor Repair Systems should be used with care to avoid damage to vessels, nerves, bladder and bowel. Attention to patient anatomy and correct use of the device will minimize risks.
- Transient leg pain may occur and can usually be managed with mild analgesics.
- Do not manipulate the GYNECARE PROLIFT Retrieval Device with sharp instruments or cut it to alter its length.

ADVERSE REACTIONS

- Potential adverse reactions are those typically associated with surgically implantable materials, including infection potentiation, inflammation, adhesion formation, fistula formation, erosion, extrusion and scarring that results in implant contraction.
- Punctures or lacerations of vessels, nerves, bladder, urethra or bowel may occur during GYNECARE PROLIFT Guide passage and may require surgical repair.

STERILITY

The GYNECARE PROLIFT Pelvic Floor Repair Systems are sterilized by ethylene oxide. DO NOT RESTERILIZE. DO NOT REUSE. Do not use if package is opened or damaged. Discard all opened, unused devices.

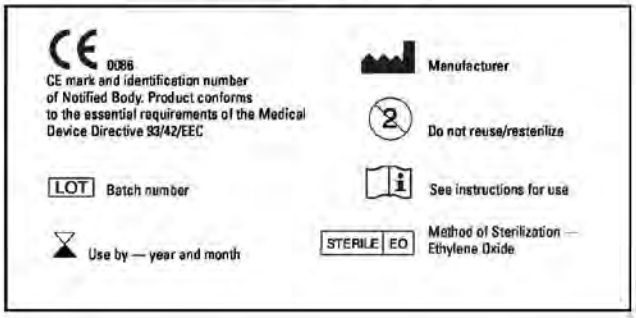
DISPOSAL

Dispose of the devices and packaging according to your facility's policies and procedures concerning biohazardous materials and waste.

STORAGE

Recommended storage conditions: controlled room temperature and relative humidity (approximately 25°C, 60% RH), away from moisture and direct heat. Do not use after expiry date.

Symbols Used on Labeling



6

The anterior prolift is implanted by blindly passing trocars inward through the perineal skin incisions, adductor muscles, obturator foramen, obturator internus, and/or levator ani, out through a mid-vaginal incision, then by attaching the mesh arms to a snare device in the trocar, and pulling the trocar with each arm of the mesh outward into place, thereby placing the central portion of the mesh either between the bladder and anterior vaginal wall (anterior Prolift) or between the rectum and the posterior vaginal wall (posterior Prolift). The anterior Prolift products require four trocar passages through the transobturator space and separate incisions. The posterior Prolift products requires two trocar passages via the transgluteal space through the sacrospinous ligament and the pudendal nerve territory.

As the Prolift mesh arms are being pulled into place, the tension may cause deformation and curling of the arms, altering the shape of the arms and the size and shape of the pores of the arms. There is no way to place these devices in a "tension-free" manner. The polypropylene mesh arms pass through muscle and densely innervated tissue and are intended to scar into place. The edges of the Prolift devices are sharp and are known to exhibit a "sawing effect" as the sheath is removed and the arms pass through delicate tissue, resulting in tissue damage.

V. DISCUSSION

When one looks at the older urogynecology textbooks, the complications of surgical procedures were mostly limited to postoperative medical complications such as postoperative bleeding, pulmonary embolus, myocardial infarctions, and deep venous thrombosis. With the introduction of synthetic materials and mesh kits into vaginal reconstructive surgery over the past decade, unprecedented complications have occurred.

Although the frequency and severity of these complications were unexpected, they were foreseeable based on the hernia literature and known properties of polypropylene including chronic inflammation, foreign body reaction, shrinkage/contraction, hardening, nerve entrapment, deformation, and degradation. These are often difficult to manage and require innovative solutions.[2]

The placement of mesh increased rapidly in POP and stress incontinence surgery; however, many complications occurred due to inappropriate techniques dictated by the devices, and many complications were recognized too late and were poorly managed. Many of these techniques, including the Prolift devices, placed mesh through muscles and densely innervated areas where gynecologic surgeons were not accustomed to operating. Complications unique to mesh (vaginal mesh extrusion, urinary tract erosion, and mesh contraction) are being reported with increasing frequency.[3] Some of these complications are new and unique and require innovative surgeries that may or may not correct the problem. Symptoms of suspected vaginal mesh complications include vaginal discharge and/or bleeding, dyspareunia, pelvic pain, and recurrent urinary tract infections.

The most common complications associated with mesh procedures, in our experience and as reported in the medical literature, are pain, dyspareunia, erosion, and de novo urinary tract symptoms.[4] These complications are very different from those seen

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[2] Giulio Santoro, MD, Pawel Wieczorek, MD, and S. A. Shobeiri, MD. *Endovaginal Three Dimensional Sonography*. Pelvic Floor Disorders 2010.

[3] Abed, H., et al. (2011). "Incidence and management of graft erosion, wound granulation, and dyspareunia following vaginal prolapse repair with graft materials: a systematic review." Int Urogynecol J 22(7): 789-798; Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.

[4] Hansen, B. L., et al. (2014). "Long-term follow-up of treatment for synthetic mesh complications." Female Pelvic Med Reconstr Surg 20(3): 126-130; Abbott, S., et al. (2014). "Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study." Am J Obstet Gynecol **210**(2): 163 e161-168; Hammett, J., et al. (2014). "Short-term surgical outcomes and characteristics of patients with mesh complications

in native tissue pelvic surgery in terms of onset, frequency, severity, character, and responsiveness to treatment. Vaginal mesh exposure, contraction and other complications can be serious and are associated with substantial morbidity. They may result in pelvic/vaginal pain on movement and dyspareunia. In addition, delay in diagnosis can cause chronic problems, which are difficult to treat even after the removal of the mesh.[5] Ultrasound has shown exceptional sensitivity and specificity over physical examination for detection of vaginal mesh (Manonai). Persistent pain after mesh implantation is a serious matter. It is, most commonly, the consequence of nerve entrapment or damage, mesh contraction, and scarring. Surgical intervention is often required to alleviate symptoms. It basically involves mobilization of the mesh, division of the fixation arms, and excision of contracted mesh. Apart from possible irreversible damage to the nerve in the case of nerve injury, secondary vaginismus and pelvic floor muscle spasm may occur. Secondary vaginismus is caused by the woman's fear of the pain and is quite difficult to treat.[6]

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from pelvic organ prolapse and stress urinary incontinence surgery." Int Urogynecol J **25**(4): 465-470; Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.; FDA Safety Communication. UPDATE on serious complications associated with transvaginal placement of surgical mesh for pelvic organ prolapse. Silver Spring, MD: Food and Drug Administration (US), Center for Devices and Radiological Health. Available at http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm262435.htm; Haylen, B. T., et al. (2011). "An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related directly to the insertion of prostheses (meshes, implants, tapes) and grafts in female pelvic floor surgery." Neurourol Urodyn 30(1): 2-12; Lee, D., et al. (2014). "Meshology: a fast-growing field involving mesh and/or tape removal procedures and their outcomes." Expert Rev Med Devices: 1-16; Rogo-Gupta, L. and S. Raz Pain Complications of Mesh Surgery. Complications of Female Incontinence and Pelvic Reconstructive Surgery. H. B. Goldman**:** 87-105; Brubaker, L. and B. Shull (2012). "A perfect storm." Int Urogynecol J **23**(1): 3-4.

[5] J. Manonai et al., "Clinical and Ultrasonographic Study of Patients Presenting with Transvaginal Mesh Complications," *Neurourol Urodyn* (2015).

[6] Marcus-Braun, N. and P. von Theobald (2010). "Mesh removal following transvaginal mesh placement: a case series of 104 operations." Int Urogynecol J 21(4): 423-430; von Theobald P.

Several groups have published widely on the evaluation and management of mesh complications. In 2012, our group reported on 133 patients who presented to our clinic for complications of vaginal mesh. The median number of complications per patient was three. The most commonly reported complication was exposure of mesh into the vagina (63.1%). Other complications included: pain (42.8%), infected mesh (6%), dyspareunia (38.3%), vaginal bleeding (24.8%), vaginal discharge (27%), stress urinary incontinence recurrence (29.3%), and pelvic organ prolapse recurrence (25.5%). Some patients had multiple complications. From this study, we determined that the majority (79%) of the patients presenting to our facility were referred by a physician other than the original vaginal mesh surgeon. In our study, the majority of patients with complications secondary to implantation of vaginal mesh who underwent reoperation at tertiary care centers were referrals and had the original implantation performed elsewhere.[7]

We recently reported a clinical and ultrasonographic study of patients presenting with transvaginal mesh complications which included 79 patients. Of these, 51.9% had vaginal/pelvic pain and 82.2% of sexually active patients had dyspareunia. In this study, we determined that endovaginal ultrasound (EVUS) was helpful in the diagnosis and management of mesh complications.[8]

Multiple publications have determined that three-dimensional endovaginal ultrasound (EVUS) is a reliable, reproducible, and well-accepted method for assessing

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Place of mesh in vaginal surgery, including its removal and revision. Best Pract Res Clin Obstet Gynaecol 2011; 25:197–203; Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.

[7] Rostaminia, G., et al. (2012). "Referral pattern for vaginal mesh and graft complications to the University of Oklahoma Pelvic and Bladder Health Clinic." J Okla State Med Assoc 105(9): 356-358.

[8] Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.

pelvic floor conditions, including mesh complications. Mesh complications are associated with distinct findings on EVUS.[9] MRI and X-ray imaging have been found to be inferior in their ability to visualize graft materials when compared with ultrasound.[10] They may visualize the swelling and edema around the mesh but not the mesh itself. Three-dimensional endovaginal ultrasound is a useful tool to evaluate outcomes of surgery with implants, delineate the reason for complications or failure, and plan treatment, especially in patients with a complicated treatment history.[11]

EVUS can be used to determine the location of a mesh device, as well as its deformability and movement with Valsalva. These findings correlate with surgical outcomes. [12] In another abstract submitted for publication at 2016 American Urogynecologic Society meeting, we describe various mesh patterns associated with pain and extrusion. Multicompartment imaging is useful in determining the location and

[9] e.g. Shobeiri A Practical Floor Ultrasonography Springer 2014; Santoro G, Wieczorek A, Shobeiri S, Mueller E, Pilat J, Stankiewicz A, et al. Interobserver and interdisciplinary reproducibility of 3D endovaginal ultrasound assessment of pelvic floor anatomy. Int Urogynecol J. 2010;22:53–9; Santoro GA, Wieczorek AP, Dietz HP, Mellgren A, Sultan AH, Shobeiri SA, et al. State of the art: an integrated approach to pelvic floor ultrasonography. Ultrasound Obstet Gynecol. 2011;37:381–96; Santoro GA, Wieczorek AP, Stankiewicz A, Wozniak MM, Bogusiewicz M, Rechberger T. High-resolution three-dimensional endovaginal ultrasonography in the assessment of pelvic floor anatomy: a preliminary study. Int Urogynecol J Pelvic Floor Dysfunct. 2009;20(10):1213–22. PubMed PMID: 19533007. [English]; Chantarasorn V, Shek KL, Dietz HP. Sonographic appearance of transobturator slings: implications for function and dysfunction. Int Urogynecol J. 2011; 22:493–8; Santoro GA, Wieczorek AP, Shobeiri SA, Mueller ER, Pilat J, Stankiewicz A, et al. Interobserver and interdis- ciplinary reproducibility of 3D endovaginal ultrasound assessment of pelvic floor anatomy. Int Urogynecol J Pelvic Floor Dysfunct. 2011;22:53–9; Santoro GA, Wieczorek AP, Shobeiri SA, Stankiewicz A. Endovaginal ultrasonography: methodology and normal pelvic floor anatomy. In: Santoro GA, Wieczorek AP, Bartram CI, editors. Pelvic floor disorders: imaging and multidisciplinary approach to management. Dordrecht: Springer; 2010. p. 61–78; Santoro GA, Wieczorek AP, Bartram C. Pelvic floor disorders: imaging and multidisciplinary approach to management. 1st ed. Italia: Springer; 2010. p. 729; Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.

[10] Hegde, A. and Davila, G. W.. Endovaginal Imaging of Vaginal Implants. S. A. Shobeiri: 133-152.

[11] *Id.* at 134.

[12] *Id.* at 139.

function of synthetic implants.[13] It can help clarify the symptoms of pain and erosion associated with mesh implants. It is also useful in patients with a history of mesh surgery in whom the exact nature of the surgery or the site of mesh placement is unknown. Imaging can be performed preoperatively to understand the intrapelvic course of the mesh implant in order to plan mesh revision surgery better. It can also be performed following mesh removal surgery to determine if there is any mesh left behind.[14] Common mesh findings on EVUS include deformation (flatness, folding, coiling, prominence, and etc.), shrinkage and contraction, fragmentation, migration, and residual mesh.

The mechanisms leading to pain after mesh placement for prolapse is multifactorial. A combination of nerve or muscle damage/entrapment and/or tension on vaginal or perivaginal structures as a result of retraction and scarring are probable explanations. These are findings regularly confirmed on ultrasound and histological examination. For example, Feiner and Maher defined a series of 'mesh contraction' in 17 women surgically managed with mesh excision. All subjects presented with intractable pelvic pain, dyspareunia and tenderness on pelvic examination associated with vaginal scarring.[15] Velemir reported a series of Prolift implants, correlating severe mesh retraction seen ultrasonographically with anterior wall prolapse recurrence.[16]

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[13] *Id.* at 144.
[14] *Id.*
[15] Feiner, B. and C. Maher (2010). "Vaginal mesh contraction: definition, clinical presentation, and management." Obstet Gynecol 115(2 Pt 1): 325-330.
[16] Velemir, L., et al. (2008). "Urethral erosion after suburethral synthetic slings: risk factors, diagnosis, and functional outcome after surgical management." Int Urogynecol J Pelvic Floor Dysfunct 19(7): 999-1006.

Mesh contraction is reported extensively in the medical literature.[17] The FDA, in its 2011 PHN states "*Mesh contraction* (shrinkage) is a *previously unidentified risk* of transvaginal POP repair with mesh that has been reported in the published scientific literature and in adverse event reports to the FDA since the Oct. 20, 2008 *FDA Public Health Notification*.[18] Reports in the literature associate mesh contraction with vaginal shortening, vaginal tightening and vaginal pain." The ICS/IUGA Joint Terminology and Classification of the Complications Related Directly to the Insertion of Prostheses

[17] Dietz, H. P. E., M.; Shek, K. L. (2011). "Mesh contraction: myth or reality?" Am J Obstet Gynecol 204(2): 173 e171-174; Klinge, U., Klosterhalfen, B., Muller, M., Ottinger, A. P., & Schumpelick, V. (1998). "Shrinking of polypropylene mesh in vivo: an experimental study in dogs." The European Journal of Surgery 164(12): 965-969; Deffieux, X., et al. (2007). "Vaginal mesh erosion after transvaginal repair of cystocele using Gynemesh or Gynemesh-Soft in 138 women: a comparative study." Int Urogynecol J Pelvic Floor Dysfunct 18(1): 73-79; Klosterhalfen, B., et al. (2005). "The lightweight and large porous mesh concept for hernia repair." Expert Rev Med Devices 2(1): 103-117; Gonzalez R., F. K., McClusky D 3rd, Ritter E.M., Lederman, A., Dillehay D. (2005). "Relationship between tissue ingrowth and mesh contraction." World J Surg 29: 1038-1043; Garcia-Urena, M. A., et al. (2007). "Differences in polypropylene shrinkage depending on mesh position in an experimental study." Am J Surg 193(4): 538-542; Gauruder-Burmester, A., et al. (2007). "Follow-up after polypropylene mesh repair of anterior and posterior compartments in patients with recurrent prolapse." Int Urogynecol J Pelvic Floor Dysfunct 18(9): 1059-1064; Tunn, R., et al. (2007). "Sonomorphological evaluation of polypropylene mesh implants after vaginal mesh repair in women with cystocele or rectocele." Ultrasound Obstet Gynecol 29(4): 449-452; Margulies, R. U., et al. (2008). "Complications requiring reoperation following vaginal mesh kit procedures for prolapse." Am J Obstet Gynecol 199(6): 678 e671-674; Feiner, B. and C. Maher (2010). "Vaginal mesh contraction: definition, clinical presentation, and management." Obstet Gynecol 115(2 Pt 1): 325-330; Velemir, L., et al. (2008). "Urethral erosion after suburethral synthetic slings: risk factors, diagnosis, and functional outcome after surgical management." Int Urogynecol J Pelvic Floor Dysfunct 19(7): 999-1006; Mamy, L., et al. (2011). "Correlation between shrinkage and infection of implanted synthetic meshes using an animal model of mesh infection." Int Urogynecol J 22(1): 47-52; Letouzey, V., Mousty, E., Huberlant, S., Pouget, O., Mares, P., de Tayrac, R. "Utrasonographic Scan Evaluation of Synthetic Mesh Used for Vaginal Cystocele Repair Comparing Four Arms Trans Obturator Techniques to Anterior Bilateral Sacro Spinous Ligament and Arcus Tendinous Suspension." J Minim Invasive Gynecol 17(6): S7–S8; Lefranc, O., Bayon, Y., Montanari, S., *et al.* (2011) Reinforcement Materials in Soft Tissue Repair: Key Parameters Controlling Tolerance and Performance-Current and Future Trends in Mesh Development. In: Von Theobald, P., *et al.*, Eds., *New Techniques in Genital Prolapse Surgery*, Springer Verlag London Ltd., London.

[18] FDA Safety Communication. UPDATE on serious complications associated with transvaginal placement of surgical mesh for pelvic organ prolapse. Silver Spring, MD: Food and Drug Administration (US), Center for Devices and Radiological Health. Available at http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm262435.htm.

(Meshes, Implants) and Grafts in Female Pelvic Floor Surgery lists mesh contraction and defines it as "shrinkage or reduction in size."[19] "Prominence" is defined as "parts that protrude beyond the surface (e.g. due to wrinkling or folding with no epithelial separation). [20] Although there is one article in the medical literature by Dietz that questions the evidence for mesh contraction, the methodology in this publication is seriously flawed and does not represent generally held opinions.[21]

There are symptoms and conditions that are unique to mesh. For example, exposure and erosion are only seen with synthetic mesh devices. There are also pain syndromes that are unique to mesh. These are often associated with characteristic findings on ultrasound and pelvic examination. When a patient presents with vaginal pain and sexual pain following a mesh procedure, this condition, more likely than not, is caused by mesh and, more likely than not, is mediated by one or more of the mechanisms discussed in this report. The reason is that mesh produces a unique constellation of symptoms that are characteristic of the presence of mesh and virtually not seen in any other setting. Although a differential diagnosis requires looking at all possible explanations for a given constellation of symptoms, there are very few, if any, other medical conditions that produce the same symptoms as mesh – especially when considered in aggregate.[22]

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[19] Haylen, B. T., et al. (2011). "An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related directly to the insertion of prostheses (meshes, implants, tapes) and grafts in female pelvic floor surgery." Neurourol Urodyn 30(1): 2-12.

[20] *Id.*

[21] Dietz, H. P. E., M.; Shek, K. L. (2011). "Mesh contraction: myth or reality?" Am J Obstet Gynecol 204(2): 173 e171-174.

[22] FDA Safety Communication. UPDATE on serious complications associated with transvaginal placement of surgical mesh for pelvic organ prolapse. Silver Spring, MD: Food and Drug Administration (US), Center for Devices and Radiological Health. Available at http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm262435.htm; Rogo-Gupta, L.

Timely recognition and referral of mesh complications is of utmost importance to prevent prolonged suffering of patients. Unfortunately, doctors in the community are often not aware of the risks of mesh. Complications are underreported. Although mesh insertion seems like an easy procedure, the treatment of complications is challenging and surgical management may require specialized expertise. Even in the best of hands, many patients will continue to have symptoms after removal of mesh. Pain is the most difficult condition to treat effectively. The arms of prolapse mesh kits (like the Prolift devices) are particularly problematic and difficult, if not impossible, to remove in their entirety.[23]

From a clinical perspective, the Prolift products are defectively designed. Features of these products rendering the products defective include the following:

1. The blind passage of synthetic mesh arms through muscle and densely-innervated tissue, resulting in tissue damage and trauma.

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and S. Raz Pain Complications of Mesh Surgery. Complications of Female Incontinence and Pelvic Reconstructive Surgery. H. B. Goldman**:** 87-105; Lee, D., et al. (2014). "Meshology: a fast-growing field involving mesh and/or tape removal procedures and their outcomes." Expert Rev Med Devices: 1-16; Novara, G., et al. (2010). "Updated systematic review and meta-analysis of the comparative data on colposuspensions, pubovaginal slings, and midurethral tapes in the surgical treatment of female stress urinary incontinence." Eur Urol 58(2): 218-238; Bako, A. and R. Dhar (2009). "Review of synthetic mesh-related complications in pelvic floor reconstructive surgery." Int Urogynecol J Pelvic Floor Dysfunct 20(1): 103-111; Hansen, B. L., et al. (2014). "Long-term follow-up of treatment for synthetic mesh complications." Female Pelvic Med Reconstr Surg 20(3): 126-130; Dunn, G. E., et al. (2014). "Changed women: the long-term impact of vaginal mesh complications." Female Pelvic Med Reconstr Surg 20(3): 131-136; Abbott, S., et al. (2014). "Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study." Am J Obstet Gynecol 210(2): 163 e161-168; Hammett, J., et al. (2014). "Short-term surgical outcomes and characteristics of patients with mesh complications from pelvic organ prolapse and stress urinary incontinence surgery." Int Urogynecol J 25(4): 465-470; Manonai, J., et al. (2015). "Clinical and ultrasonographic study of patients presenting with transvaginal mesh complications." Neurourol Urodyn.

[23] Abbott, S., et al. (2014). "Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study." Am J Obstet Gynecol 210(2): 163 e161-168; Danford, J. M., et al. (2015). "Postoperative pain outcomes after transvaginal mesh revision." Int Urogynecol J 26(1): 65-69; Hansen, B. L., et al. (2014). "Long-term follow-up of treatment for synthetic mesh complications." Female Pelvic Med Reconstr Surg 20(3): 126-130. Hammett, J., et al. (2014). "Short-term surgical outcomes and characteristics of patients with mesh complications from pelvic organ prolapse and stress urinary incontinence surgery." Int Urogynecol J 25(4): 465-470.

2. The high, asymmetrical, and unpredictable degree of shrinkage/contraction of the device including the arms.

3. The failure of the central portion of the mesh device to lie flat when there is tension from the arms.

4. The difficulty or impossibility of removing the entire device when complications warrant.

5. The need for multiple surgeries to remove the mesh.

6. The chance of persistent symptoms, especially pain, even after the device has been removed.

7. The late onset of complications that may occur indefinitely into the future.

8. The products cause chronic pain syndromes (resulting from nerve entrapment, scarring, mesh deformation and contraction and inflammation), that are often extremely difficult to treat

I have reviewed and am familiar with the Instructions for Use for the Prolift products.[24] I have also reviewed the IFUs for many other medical products throughout my career. To make an informed decision of whether or not to use a particular product, the physician must be warned not only of the potential adverse events that may be associated with the product, but also the frequency, severity, duration and potential permanence of those adverse events. In addition, doctors need this information to adequately inform their patients of the risks and benefits of a given treatment option.

Ethicon's Prolift IFUs are inaccurate, misleading, and incomplete. As such, they do not inform doctors and patients of the true risks associated with the Prolift devices. The IFU states that the "bi-directional elastic property allows adaptation to various stresses encountered in the body". I found no evidence supporting this claim, nor is it consistent with the medical literature or my experience. The IFU states that "animal

[24] ETH.MESH.02341658; ETH.MESH.02341522; ETH.MESH.02341454; ETH.MESH.02001398.

studies show that implantation of GYNECARE GYNEMESH PS mesh elicits a minimum to slight inflammatory reaction, which is transient and is followed by the deposition of a thin fibrous layer of tissue which can grow through the interstices of the mesh, thus incorporating the mesh into adjacent tissue. The mesh remains soft and pliable, and normal wound healing is not noticeably impaired. The material is not absorbed, nor is it subject to degradation or weakening by the action of tissue enzymes." I did not see animal studies that were long-term or with mesh implanted in the vagina of an appropriate model. Nor did I see human studies supporting this claim. This statement contradicts the medical literature and my experience.

Nowhere do the IFUs address the severity, frequency, unresponsiveness to treatment, or the permanence of complications. The IFUs minimize the risks by stating that "potential adverse reactions are those typically associated with surgically implantable materials". This is simply not the case. In a 2009 update, the IFU also trivialized the severe complications seen with the Prolift devices by stating that "potential adverse reactions are those typically associated with pelvic organ prolapse repair procedures, including pelvic pain or pain with intercourse. These may resolve in time."[25]

I have personally observed and treated patients who have been implanted with Prolift products. Sadly, my own patients have had Prolift related complications. I have seen patients who have experienced the following device-related complications, often severe and life-altering:

- Chronic pain syndromes;
- Chronic inflammation of tissue surrounding mesh;

[25] ETH.MESH.02001398.

- Excessive scar plate formation, scar banding, and contracture of mesh arms, resulting in asymmetrical pulling on the central portion, causing pain;
- Erosion of mesh into the bladder and rectum and recurrent exposure of mesh in the vagina;
- Pudendal neuralgia;
- Pelvic floor muscle spasm;
- Nerve damage or nerve entrapment as a result of mesh scarification and fibrotic bridging;
- Dyspareunia and sexual impairment, sometimes permanent;
- Constipation or fecal incontinence;
- Deformed, wrinkled, folded, curled, roped, degraded and fragmented mesh upon removal and visualized with ultrasound;
- Encapsulation of mesh (mesh covered in thick scar);
- Vaginal shortening, tightening, stenosis and/or other deformation;
- Infection as a result of the mesh, including bladder infections, vaginal infections, chronic urinary tract infections, and abscesses;
- Vaginal erosion and extrusion and visceral erosion;
- De novo urinary symptoms;
- "Hispareunia".

The published medical literature also reports these same types of complications with transvaginal pelvic organ prolapse repair implants.[26] Clinical trials would have

[26] Hansen, B., et al., *Long-Term Follow-up of Treatment for Synthetic Mesh Complications*, Female Pelvic Med & Reconstr Surg 2014, 20:126-130; Barski D, et al., *Systematic review and classification of complications after anterior, posterior, apical, and total vaginal mesh implantation for prolapse repair.* Surg Technol Int. 2014, 24:217-24.; Shah, et. al., *Mesh complications in female pelvic floor repair surgery and their management: A systematic review.* Indian J Urol. 2012 Apr; 28(2):129-53; Feiner, B., et al., *Vaginal Mesh Contraction: Definition, Clinical Presentation and Management*, Obstet Gynecol 2010, 115:325-330; Morrisoe, S., et al., *The use of mesh in vaginal prolapse repair: do the benefits justify the risks?* Current Opinion in

shown that functional outcomes are inferior with transvaginally placed armed mesh when compared with non-mesh procedures.

Based upon my education, training, experience and knowledge, and my familiarity with the published literature relating to this subject, it is my professional opinion to a reasonable degree of medical certainty that the injuries and complications that I have personally observed, diagnosed and treated associated with the Prolift products are directly attributable to the defective design of these products as described previously.

The IFU should have warned about the potential for the mesh to cord, buckle, wrinkle, deform, and degrade, the potential for permanent pain as a result of the mesh, and the potential of multiple tedious, difficult, and risky surgeries in the event the mesh needed to be removed. Having read and relied upon IFUs for medical devices during my career**,** it is my opinion that the type of information detailed above should be communicated to surgeons so that they can make safe treatment choices for their patients. If physicians are not fully and timely informed of all of the information known to the manufacturer concerning the safety of the product, they cannot be expected to perform an adequate risk-benefit analysis or obtain informed consent from their patients.

The design of the Prolift products is defective. As the mesh arms scar into tissue and deform, they can pull asymmetrically on the central portion of the mesh. This can result in the bunching, folding or wrinkling of the center mesh portion, which is intended to stay flat. This often causes pain and can lead to erosion or extrusion of the mesh

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Urology 2010, 20:275-279; Blandon, et al., *Complications from vaginally placed mesh in pelvic reconstructive surgery*, Int Urogynecol J 2009, 20:523-31; Jacquetin, B, *Complications of Vaginal Mesh: Our Experience*, Int Urogyn J, 2009, 20:893-6; Margulies et al, *Complications requiring reoperation following vaginal mesh kit procedures for prolapse*, Am J Obstet Gynecol December 2008.

through the vaginal mucosa. The arms of the mesh pull on their anchoring points in the pelvic sidewall muscles (obturator, sacrospinous ligament and levator ani) and tend to pull these anchoring points and the attached muscles or underlying nerves toward the midline. This pulling can be asymmetrical, non-uniform and pain at rest, during sexual intercourse, during defecation, and during normal daily activities like coughing and straining. Attempts at defecation or sexual penetration push on the mesh, aggravating the pulling on the arms, which in turn causes new or worsening pain. During many normal activities, pressure is placed on the mesh, which is transmitted to the attachments in the pelvic sidewall and entrapped scarred nerves, also deforming and pulling on the muscle and nerves at the attachment points. This is something I frequently observe in my practice and is reported in the medical literature.

As the central portion and arms of the Prolift devices scar in, the resulting shrinkage or contracture of the tissues surrounding the mesh can entrap nerves and nerve branches and result in severe, permanent and difficult-to-treat or untreatable pain as a result of the chronic inflammatory response and fibrosis.[27]

It is extremely difficult and traumatic to attempt to remove all of the Prolift mesh once it has been implanted. It is virtually impossible to remove all of an armed transvaginal mesh implant. There is no evidence that Ethicon ever considered what should be done if the mesh caused complications and all or part of the mesh needed to be removed. The inability to remove all of the mesh can cause long-lasting complications,

[27] Smith T, et al., Pathologic Evaluation of Explanted Vaginal Mesh: Interdisciplinary Experience from a Referral Center. Female Pelvic Med Reconstr Surg 2013; 19:238-41; Klosterhalfen, et al., The Lightweight and Large Porous Mesh Concept for Hernia Repair. Expert Rev. Med. Devices 2(1) 2005; Castellanas ME et al., Pudendal Neuralgia After Posterior Vaginal Wall Repair with Mesh Kits: An Anatomical Study and Case Series. Journ Minimally Invasive Gynecol 19 (2012) S72.

including chronic pain. Surgeries to attempt to remove pieces of the mesh increase the presence of scar tissue, which can create or contribute to the patient's pelvic pain, dyspareunia and normal function of the pelvic area.

In designing a pelvic repair mesh product intended to be sold and implanted by physicians like myself, a reasonable device manufacturer must consider and weigh all of the known risks versus the benefits of a particular design, as well as all information known to the manufacturer that may bear on the safety and efficacy of the design, including the gravity, severity, likelihood, and ability to avoid of the dangers associated with the design.

The armed, blind trocar-based implantation methodology is an inherently flawed part of the design of the Prolift products. If mesh is used, there are safer implantation designs available, including abdominal / laparoscopic sacrocolpopexy. I perform abdominal or laparoscopic sacrocolpopexy (SC) procedures using mesh. The SC procedure is designed to address prolapse in the apical, anterior, and posterior pelvic floor. The SC uses a "Y" shaped implant to lift the vaginal apex, anterior, and posterior walls to a position inside the pelvic cavity, by attaching the mesh to the apex of the vagina, and attaching the other end of the mesh to a ligament overlying the sacral promontory. Implants used in sacrocolpopexy are passed into position via an abdominal incision, and are not exposed to the bacteria and other organisms in the vagina. Thus, the potential for microbial contamination of the SC mesh is greatly decreased.

Implants used as reinforcement in SC are anchored in a vertical direction, and are not attached to the muscles in the pelvis. When abdominally placed mesh contracts during normal healing, this tends to result in a pulling up, or lengthening of the vagina,

without the pain associated with pulling on muscle with the Prolift devices. Also, by placing the mesh abdominally instead of transvaginally, the risk for infection, excessive inflammatory response, delayed healing and erosion is reduced. The mesh placed for SC behaves differently is safer than transvaginally implanted Prolift products. Products designed for SC implantation are safer, feasible alternatives to transvaginal mesh kits like the Prolift mesh products.

The fact that polypropylene mesh has been used for hernia repair in the abdomen does not establish or support its safety or efficacy for use in the female vagina. Unlike the abdomen, the vagina is multi-planar and subject to multidirectional forces. The vagina is composed of delicate, sensitive tissue. It is a functional organ and its function relies on its movement. Placing a large piece of mesh under the bladder or over the rectum attached to fixed points in the pelvis eliminates the vagina's capacity for movement and functionality.

In my interactions with Ethicon representatives, I expressed my concerns regarding the lack of clinical data. Patients are not more satisfied with armed mesh as compared to traditional repairs. And, in studies comparing the anatomical success of TVM with traditional repairs, the notion of what is a successful repair depends upon the different definitions of "success" given by different authors.

When the definition of successful prolapse repair surgery includes both anatomic and functional outcomes, it is now clear that the risk of TVM surgery is greater than the benefit. In my experience with vaginal mesh kits, I had more blood loss, more adverse events such as pudendal neuralgia and unpredictable anatomic results. This is reported in

the medical literature as well. Transvaginal mesh has a higher re-operation rate than native tissue repair due to the rate of surgeries for attempted repair of complications.[28]

It is also now clear that there is no functional or anatomic benefit for TVM in the posterior compartment [29] TVM may offer improved anatomical outcomes for polypropylene mesh compared with anterior native tissue repair. However, these outcomes do not translate into improved functional outcomes or a lower reoperation rate for prolapse. The mesh group is associated with increased morbidity, mesh extrusion, and higher reoperation rates.[30]

In a double-blind randomized trial comparing vaginal prolapse repair with and without mesh, there was no difference in anatomic benefit at three years; and there was a 15% mesh exposure rate after three months.[31]

To summarize, there is no good evidence supporting benefit in quality of life or relief of symptoms in any compartment with the use of TVM to treat pelvic organ prolapse, and many of the complications of TVM surgery are likely to be more frequent and more severe, unlike those seen with traditional prolapse repairs.

It is also my opinion that the information available to Ethicon in the scientific literature (and Ethicon's internal documents) concerning the potential for polypropylene degradation should have prompted Ethicon to conduct clinical studies to determine whether naturally occurring conditions in the pelvis and vagina could cause the

[28] de Tayrac R et al., Complications of POP Surgery and Methods of Prevention, Int. Urogynecol. J. 2013; 24:1859-1872.
[29] Karram M, Maher C, Surgery for Posterior Wall Prolapse. Int. Urogynecol. J. 2013; 24(11): 1835-41.
[30] Maher C, Anterior Vaginal Compartment Surgery. Int. Urogynocol. J. 2013; 24:1291-1802; Ostergard D, Evidence-based Medicine for Polypropylene Mesh Use Compared with Native Tissue Repair. Urology 79: 12-15, 2012.
[31] Gutman et al., Three-Year Outcomes of Vaginal Mesh for Prolapse. Obstet Gynecol 2013; 122:770-7.

polypropylene mesh to degrade and, if so, to establish what the clinical implications for patients would be.

Ethicon's physician training program for the Prolift products was inadequate, and resulted in Ethicon's "certification" of numerous physicians who were undertrained and who lacked the experience, skills and expertise necessary to properly perform the implantation of these products.[32] Ethicon's documents reflect that Ethicon did not consider physician training to be a priority, or even a necessity.[33]

My personal experience with Ethicon was that I was approached as a "thought leader" to perform the Ethicon procedures. Identifying the "thought leaders" in the community was a popular industry strategy in convincing the community physicians to use their products which in part lacked credible efficacy and safety evidence. I did perform a few Prolifts all of which were associated with complications. I approached these complications quickly and resolved them by removing the mesh, but I have seen community physicians not properly informed of the complications, let the complications linger.

Particularly in light of Ethicon's knowledge about the risks inherent in the design of its products which Ethicon's internal documents specifically recognize, Ethicon's design of the Prolift products was unreasonably dangerous and defective. The Prolift devices failed to perform as safely as a patient or physician would expect when implanted in the intended manner, and the probability of a serious complication developing was so high that the risk of using the product outweighed any potential benefit.

Dated: January 29, 2016

[32] ETH.MESH.00005098; ETH.MESH.00847816; ETH.MESH.0409664; ETH.MESH.01184119.
[33] ETH.MESH.00031538-00031560 ("Professional Education Events . . . Indicated by market analysis . . . Must have strong case for "Return on Investment"); ETH.MESH.00005098.

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Additional Reliance Materials

Ulmsten U, Hendriksson L, Johnson P, Varhos G. An ambulatory surgical procedure under local anaesthesia for treatment of female urinary incontinence. Int Urogynecol J Pelvic Floor Dysfunct. 1996;7:81–6.

Delorme E. Transobturator urethral suspension: miniinvasive procedure in the treatment of stress urinary incontinence in women. Prog Urol. 2001;11:1306–13.

Schuettoff S, Beyersdorff D, Gauruder-Burmester A, Tunn R. Visibility of the polypropylene tape after tension-free vaginal tape (TVT) procedure in women with stress urinary incontinence: comparison of introital ultrasound and magnetic resonance imaging in vitro and in patients. Ultrasound Obstet Gynecol. 2006;27(6):687–92.

Kaum HJ, Wolff F. TVT: on midurethral tape positioning and its infl uence on continence. Int Urogynecol J. 2002;13(2):110–5.

Halaska M, Otcenasek M, Martan A, Masata J, Voight R, Seifert M. Pelvic anatomy changes after TVT procedure assessed by MRI. Int Urogynecol J. 1999;10(S1):S87–8.

Dietz HP. Imaging of implant materials. In: Dietz HP, Hoyte LPJ, Steensma AB, editors. Atlas of pelvic floor ultrasound. London: Springer; 2008.

Davila W. Nonsurgical outpatient therapies for the management of female stress urinary incontinence: long-term effectiveness and durability. Adv Urol. 2011;2011:1–14.

Hegde A, Smith AL, Aguilar VC, Davila GW. Three dimensional endovaginal ultrasound examination following injection of Macroplastique for stress urinary incontinence: outcomes based on location and periurethral distribution of the bulking agent. Int Urogynecol J. 2013;24(7):1151–59.

Santoro GA, Wieczorek AP, Stankiewicz A, Wozniak MM, Bogusiewicz M, Rechberger T. High resolution 3D endovaginal ultrasonography in the assessment of pelvic floor anatomy: a preliminary study. Int Urogynecol J. 2009;20:1213–22.

Kociszewski J, Rautenberg O, Perucchini D, Eberhard J, Geissbuhler V, Hilgers R, Viereck V. Tape functionality: sonographic tape characteristics and outcome after TVT incontinence surgery. Neurourol Urodyn. 2008;27:485–90.

Jijon A, Hegde A, Arias B, Aguilar V, Davila GW. An inelastic retropubic suburethral sling in women with intrinsic sphincter defi ciency. Int Urogynecol J.; 2012 Dec 11 (Epub ahead of print).

Dietz HP, Foote AJ, Mak HL, Wilson PD. TVT and Sparc suburethral slings: a case-control series. Int Urogynecol J. 2004;15(2):129–31.

Ng CC, Lee LC, Han WH. Use of 3D ultrasound scan to assess the clinical importance of midurethral placement of the tension-free vaginal tape (TVT) for treatment of incontinence. Int Urogynecol J. 2005;16(3):220–5.

Dietz HP, Mouritsen L, Ellis G, Wilson PD. How important is TVT location? Acta Obstet Gynecol Scand. 2004;83(10):904–8.

Hegde A, Nogueiras M, Aguilar V, Davila GW. Correlation of static and dynamic location of the transobturator sling with outcomes as described by 3 dimensional endovaginal ultrasound. Abstract. 38th Annual meeting of the International Urogynecological Association, Dublin, Ireland; 2013, in press.

Bogusiewicz M, Stankiewicz A, Monist M, Wozniak M, Wiezoreck A, Rechberger T. Most of the patients with suburethral sling failure have tapes located outside the high-pressure zone of the urethra. Int Urogynecol J. 2012;23 Suppl 2:S68–9.

Lo TS, Horng SG, Liang CC, Lee SJ, Soong YK. Ultrasound assessment of mid-urethra tape at threeyear follow-up after tension-free-vaginal tape procedure. Urology. 2004;63(4):671–5.

Dietz HP, Mouritsen L, Ellis G, Wilson PD. Does the tension-free vaginal tape stay where you put it? Am J Obstet Gynecol. 2003;188(4):950–3.

Kociszewski J, Rautenberg O, Kuszka A, Eberhard J, Hilger R, Viereck V. Can we place tension-free vaginal tape where it should be? The one-third rule. Ultrasound Obstet Gynecol. 2012;39:210–4.

Rechberger T, Futyma K, Jankiewicz K, Adamiak A, Bogusiewicz M, Bartuzi A, Miotla P, Skorupski P, Tomaszewski J. Tape fi xation: an important surgical step to improve success rate of anti-incontinence surgery. J Urol. 2011;186(1):180–4.

Hegde A, Nogueiras M, Aguilar V, Davila GW. Should a suburethral sling be suture-fi xated in place at the time of implantation? Abstract. 38th annual meeting of the International Urogynecological Association, Dublin, Ireland; 2013, in press.

Chantarasorn V, Shek KL, Dietz HP. Sonographic appearance of transobturator slings: implications for function and dysfunction. Int Urogynecol J. 2011;
22:493–8.

Yang JM, Yang SH, Huang WC, Tzeng CR. Correlation of tape location and tension with surgical outcome after transobturator suburethral tape procedures. Ultrasound Obstet Gynecol. 2012;39:458–65.

Hegde A, Nogueiras M, Aguilar V, Davila GW. Is there concordance in the location of the transobturator sling as determined by transperineal and endovaginal 3 dimensional ultrasound?: correlation with outcomes. Abstract. 38th annual meeting of the International Urogynecological Association, Dublin, Ireland; 2013, in press.

FDA Safety Communication. UPDATE on serious complications associated with transvaginal placement of surgical mesh for pelvic organ prolapse.
Silver Spring, MD: Food and Drug Administration (US), Center for Devices and Radiological Health. Available at http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm262435.htm . Accessed 13 July 2011.

Gauruder-Burmester A, Koutouzidou P, Rohne J, Gronewold M, Tunn R. Follow-up after polypropylene mesh repair of anterior and posterior compartments in patients with recurrent prolapse. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18(9):1059–64.

Iglesia CB, Sokol AI, Sokol ER, Kudish BI, Gutman RE, Peterson JL, Shott S. Vaginal mesh for prolapse. Obstet Gynecol. 2010;116:293–303.

Shek K, Dietz HP, Rane A. Transobturator mesh anchoring for the repair of large or recurrent cystocele. In: ICS annual scientifi c meeting, Christchurch, New Zealand. Abstract; 2006.

Hegde A, Aguilar VC, Davila GW. Non-cross-linked porcine dermis graft becomes completely integrated with host tissue over a period of 12 months. In: IUGA annual scientifi c meeting, Brisbane, Australia. Abstract; 2012.

DeFreitas G, Wilson T, Zimmern P, Forte T. 3D ultrasonography: an objective outcome tool to assess collagen distribution in women with stress urinary incontinence. Urology. 2003;62:232–6.

Poon CI, Zimmern PE, Wilson TS, Defreitas GA, Foreman MR. Three-dimensional ultrasonography to assess long-term durability of periurethral collagen in women with stress urinary incontinence due to intrinsic sphincter defi ciency. Urology. 2005;65: 60–4.

Athansiou S, Khullar V, Boos K, Salvatore S, Cardozo L. Imaging of the urethral sphincter with threedimensional ultrasound. Obstet Gynecol. 1999;94: 295–301.

Benshushan A, Brzezinski A, Shoshani O, Rojansky N. Periurethral injection for the treatment of urinary incontinence. Obstet Gynecol Surv. 1998;53: 383–8.

Khullar V, Cardozo LD, Abbott D, Hillard T, Norman S, Bourne T. The mechanism of continence achieved with GAX collagen as determined by ultrasound (abstract). Neurourol Urodyn. 1993;78:439–40.

Radley S, Chapple C, Mitsogiannis I, Glass K. Transurethral implantation of Macroplastique for the treatment of female stress urinary incontinence secondary to urethral sphincter defi ciency. Eur Urol. 2001; 39:383–9.
Vollebregt, et. al., Bacterial colonization of collagen coated PP vaginal mesh: are additional intraoperative sterility procedures useful? Int. Urogynecol J Pelvic Floor Dysfun. 2009 Nov; 20(11): 1345-51.

Junge, Elasticity of the anterior abdominal wall and impact for reparation of incisional hernias suing mesh implants; Hernia 2001; 5: 113-118.

de Tayrac R et al., Complications of POP Surgery and Methods of Prevention, Int. Urogynecol. J. 2013; 24:1859-1872.

Karram M, Maher C, Surgery for Posterior Wall Prolapse. Int. Urogynecol. J. 2013; 24(11): 1835-41.

Maher C, Anterior Vaginal Compartment Surgery. Int. Urogynocol. J. 2013; 24:1291-1802; Ostergard D, Evidence-based Medicine for Polypropylene Mesh Use Compared with Native Tissue Repair. Urology 79: 12-15, 2012.

Gutman et al., Three-Year Outcomes of Vaginal Mesh for Prolapse. Obstet Gynecol 2013; 122:770-7.

Cervigni M, et al. Transvaginal Cystocele Repair with Polypropylene Mesh Using A Tension Free Technique. Int. Urogynecol. J. Pelvic Floor Dysfunct 2008; 19(4):489-96.

Vollbregt A, et al. Primary Surgical Repair of Anterior Vaginal Prolapse: A randomized trial comparing anatomical and functional outcome between anterior colporrhaphy trocar-guided transobturator anterior mesh. 2011 BJOG 118(12): 1518-1527.

Altman, D., and C. Falconer. "Intra and Perioperative Morbidity Using Transvaginal Mesh in Pelvic Organ Prolapse Repair." *Obstet Gynecol* 109, no. 2 Pt 1 (Feb 2007): 303-8.

Manonai, J., G. Rostaminia, L. Denson, and S. A. Shobeiri. "Clinical and Ultrasonographic Study of Patients Presenting with Transvaginal Mesh Complications." *Neurourol Urodyn* (Jan 25 2015).

Gynecare

GYNECARE PROLIFT* Pelvic Floor Repair System

Total Pelvic Floor Repair
Anterior Pelvic Floor Repair
Posterior Pelvic Floor Repair

SURGICAL TECHNIQUE

*Tradmark

Principles of the Procedure

The objective of the PROLIFT procedure is to achieve a complete anatomic repair of pelvic floor defects in a standardized way. Depending on the site of the defect and surgeon's preference, the repair can either be anterior, posterior, or total. The repair is achieved by the placement of one or two synthetic non-absorbable polypropylene (GYNEMESH* PS) mesh implants via a vaginal approach.

The procedure requires a wide dissection in order to properly place the relatively large implants. These implants are designed to cover all existing or potential pelvic floor defects in a tension free way.

Hysterectomy

Surgeon's preference and the patient's needs will determine if a concurrent hysterectomy is required. Peritonealization is recommended to avoid contact of the mesh to the bowel when a hysterectomy is performed. Retrospective data analysis suggests that the rate of mesh exposure may be higher when performing the TransVaginal Mesh (TVM) procedure with concurrent hysterectomy.

Vaginal Incisions

The principles regarding vaginal incisions include minimizing the size of the vaginal incisions and avoiding T-shaped incisions. Thus, when a vaginal hysterectomy is performed, it is recommended to avoid complementary sagittal incisions. This will dictate that the bladder dissection be performed through the pericervical incision.

Mesh Fixation

The implants are held in place by friction acting on the associated straps passing through tissue. If required, additional stitches may be used along with the straps to aid in proper placement of the Implant. It is essential to install all of the available mesh straps to properly place and secure the implants.

Vaginal Preservation

It is recommended to avoid large vaginal excisions and fixation of the vagina to the implant.

Procedural Description

The procedure must be postponed if one of the following conditions is present:

- Vaginal infection
- Vaginal erosions
- Urinary infection

Additionally, the procedure should also be cancelled if a perioperative bladder or rectal injury occurs.

Preoperative Preparation

Repairs performed with the GYNECARE PROLIFT Pelvic Floor Repair System may be carried out under general or regional anesthesia according to surgeon's preference. Systematic preoperative antibiotic prophylaxis may be administered according to surgeon's preference.

The following steps are recommended prior to the start of the procedure:

- Antiseptic vaginal preparation
- Shaving or clipping of the pubic or vulvar hair
- Bowel preparation or preoperative enema
- Cleansing of the entire surgical area with appropriate antiseptic

The following steps are to be considered optional:

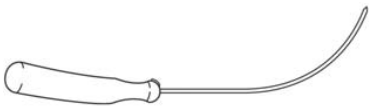
- Placement of an in-dwelling catheter after a urine culture has been performed
- Placement of lubricated packing in the rectum
- Infiltration of the vaginal wall by saline with a vasoconstrictive solution to ease dissection and reduce bleeding
- Administration of antibiotics

Patient positioning

The patient should be placed in the lithotomy position with her buttocks slightly overlapping the table and her thighs flexed at approximately 90 degrees in relation to the plane of the table.

GYNECARE PROLIFT* Repair System

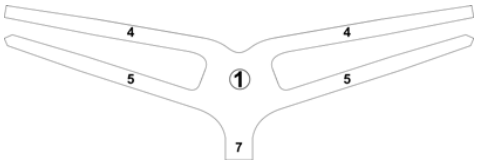
Nomenclature



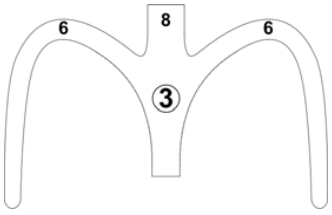
GYNECARE PROLIFT* Guide

GYNECARE PROLIFT* Cannula

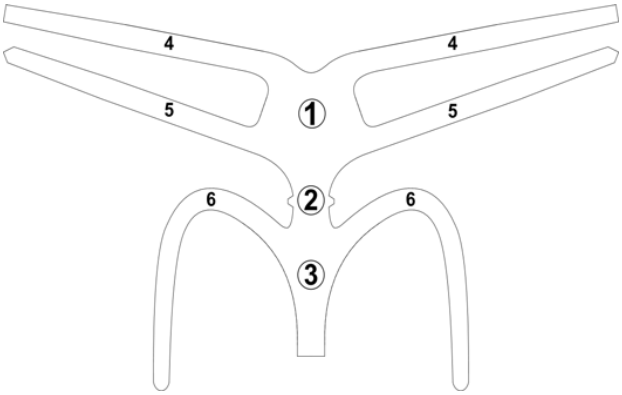
GYNECARE PROLIFT* Retrieval Device



Anterior Implant



Posterior Implant



Total Implant

Total Repair with Vaginal Hysterectomy

The procedure begins with a vaginal hysterectomy with or without adnexectomy, followed by an anterior repair and then a posterior repair. Retrospective data analysis suggests that the rate of mesh exposure may be higher when performing the TVM procedure with concurrent hysterectomy.

Vaginal Incision and Hysterectomy

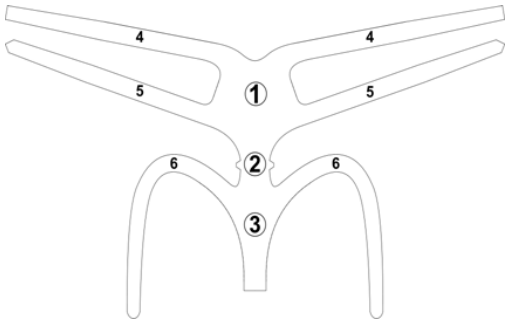
A standard vaginal hysterectomy is performed through a pericervical incision. It is recommended that users identify and retain the uterosacral ligaments or other elements of the cardinal ligament complex. These structures can later be interposed between the implant and the vagina or attached to the edges of the Total Implant according to surgeon's preference. Care must be taken to close the peritoneum.

The ensuing procedure steps will ideally be performed without any complementary sagittal incision whenever possible. Alternatively, a sagittal anterior colpotomy starting at the vaginal incision and ending approximately 1 cm from the bladder neck could be used if needed.

Anterior Dissection

Grasp and maintain control of the anterior vaginal wall with a series of three atraumatic forceps. Perform a dissection of the entire thickness of the anterior vaginal wall. It is preferred to leave Halban's fascia (pubocervical fascia) on the vaginal wall. Dissection begins from the vaginal incision and should continue up to a point approximately 3-4 cm from the urinary meatus, in order to preserve and protect the region of the bladder neck.

Dissect the bladder laterally up to the vaginal cul de sac. When a defect exists, a finger will easily penetrate the paravesical fossa (paravaginal space). If no defect is evident, an orifice must be created in the fascia using blunt dissection techniques. This dissection is the starting point for a broad lateral dissection of the bladder, which will make it possible to identify the whole length of the arcus tendineus fascia pelvis (ATFP), which extends from the posterior aspect of the pubic arch to the ischial spine. If the ATFP cannot easily be identified, then palpation via a finger in the vagina from the pubic arch to the ischial spine should be used to ensure that straps 4 and 5 of the Anterior Segment (1) pass through at this level.



Anterior Segment (1) of Total Implant

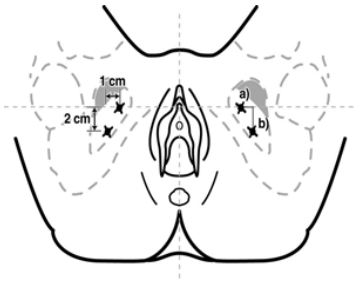
At this point, if required, plication of the bladder is performed in order to reduce the cystocele.

Preparation for Placement of the Anterior Segment

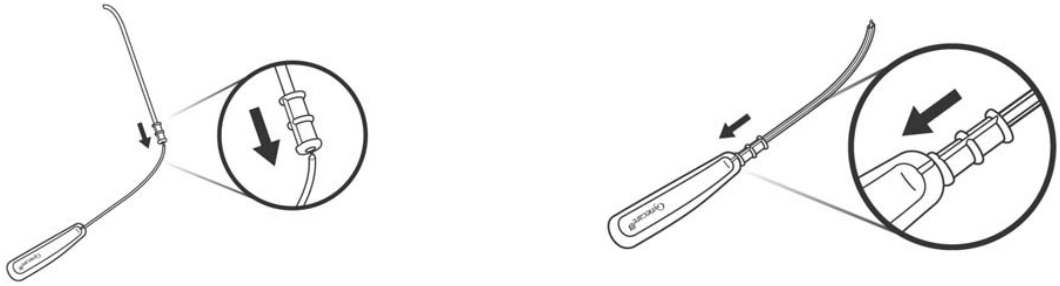
The following should be performed on the patient's left and right.

The Superficial Straps

The limits of the obturator foramen are identified by palpation between the thumb and index finger of the obturator membrane where it comes into contact with the bony boundaries. The cutaneous incision for passage of the superficial strap of the Anterior Segment (4) is made in the anteromedial edge of the obturator foramen, at the level of the urethral meatus. A 4 mm incision is made to enable the Guide with the Cannula installed to pass through the skin without tearing. It is helpful to mark the edge of the obturator foramen with a skin marking pen as a guide for the entrance locations.

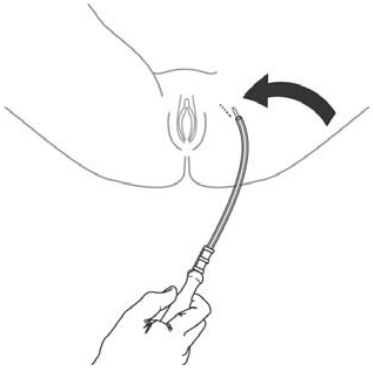


At the start of the passage, the Cannula-equipped Guide will perforate the obturator externus muscle and then the obturator membrane. The device should then be advanced medially through the obturator membrane and pass through the obturator internus muscle approximately 1 cm from the proximal (prepubic) end of the ATFP.



Cannula-equipped Guide

A finger positioned inside the vaginal dissection should always be used to ensure that the device follows the proper path and to provide protection to the bladder. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. Care should be taken to keep the Cannula in position, as the Guide is withdrawn to ensure that the tip of the Cannula remains slightly extended out of the tissue passage and the Cannula is not advanced further into the patient.

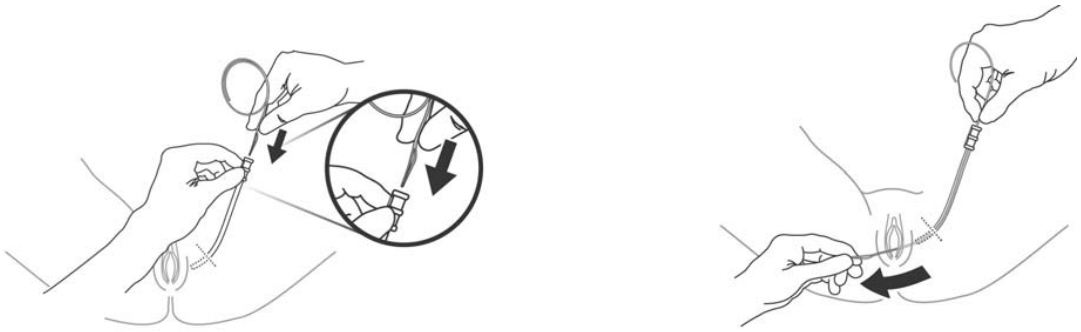


Passage of Cannula-equipped Guide

Remove Guide and leave Cannula

Once the Guide has been removed from the cannula, do not attempt to reinsert. Instead, remove the Cannula from the patient, reinstall the Guide, and then reinsert the Cannula into the patient.

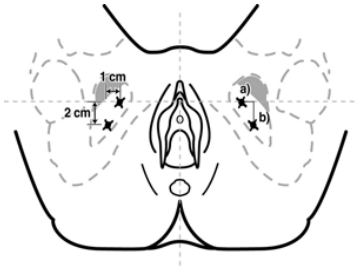
Following placement of the Cannula, the Retrieval Device is passed down and advanced out of the distal end of the installed Cannula. The looped end of the Retrieval Device is then retrieved through the vaginal dissection and pulled out of the vagina with an instrument or a finger.



Pass Retrieval Device

The proximal end of the Retrieval Device can then be passed through the loop and secured to the drape or a retractor, thus reserving the Retrieval Device for later use in pulling the Total Implant strap into position. Optionally, the Cannulas may also be secured when placed in order to limit movement as the other Cannulas are installed. Care should be taken to avoid movement of the Cannulas following placement.

The Deep Straps



For placement of the deep strap of the Anterior Segment, a second cutaneous incision is made 1 cm lateral and 2 cm below the preceding incision at the posterolateral edge of the obturator foramen. To provide protection of the bladder, a Breisky or similar long retractor may be placed in the dissection. The Guide and Cannula are then inserted through the obturator externus muscle and then through the obturator membrane. The device should follow a downward trajectory once it passes through the obturator membrane. This movement will enable the Cannula-equipped Guide to emerge through the obturator internus muscle at the bottom of the paravesical fossa behind the ATFP, approximately 1 cm from the ischial spine.

A finger positioned inside the vaginal dissection should be used to ensure that the Guide follows the proper path and to provide protection to the bladder. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. The Retrieval Device is then installed and secured as described above.

Posterior Vaginal Incision
The recommended incision for this repair is a complementary sagittal colpotomy of the lower / distal half of the vagina ending at the vulva. Alternatively, the dissection can be performed through a complementary transverse incision made at the junction of the perineal skin and the vagina. If a perineal repair is indicated, a diamond-shaped incision overlapping the lower half of the sagittal colpotomy and the posterior perineum is recommended.

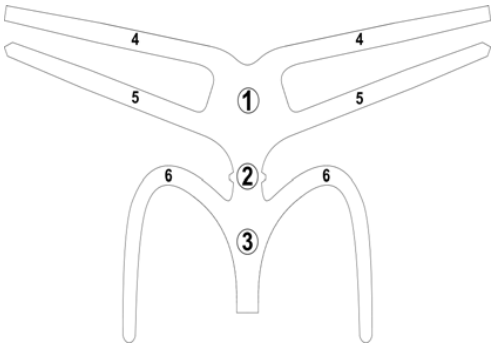
Posterior Dissection
Care should be taken when separating the rectum from the entire thickness of the vagina. Dissection of the entire thickness of the posterior vaginal wall should be performed starting from the vaginal incision and continued up to the apex of the vagina. Laterally, the dissection opens the pararectal spaces and follows the space between the rectum and the levator ani muscle until the sacrospinous ligament can be palpated.

Generally, this dissection enables placement of a Breisky retractor or other such instrument which will be useful during later activities. Further deep dissection should then be performed to expose both sides of the sacrospinous ligament at the level of the ischial spine.

At this point, if required, a plication of the prerectal fascia in order to reduce the rectocele should be performed. Any required reductions of enteroceles should also be performed at this time.

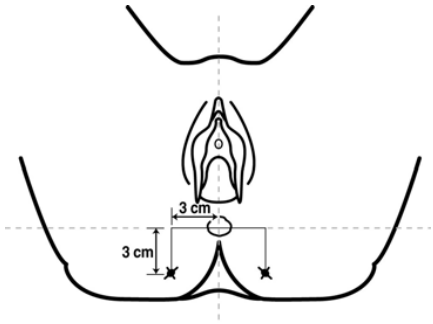
Preparation for Placement of the Posterior Segment

The following should be performed on the patient's left and right.



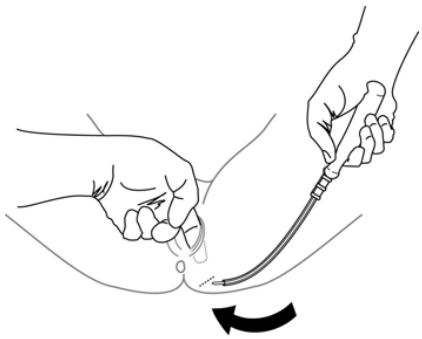
Posterior Segment (3) of Total Implant

The Posterior Segment (3) of the Total Implant is to be positioned in the ischioanal fossa, inferior to levator ani muscle, and secured by passage of the straps through the sacrospinous ligament and coccygeus muscles. To accomplish this, a 4 mm cutaneous incision is made approximately 3 cm lateral and 3 cm down from the anus.



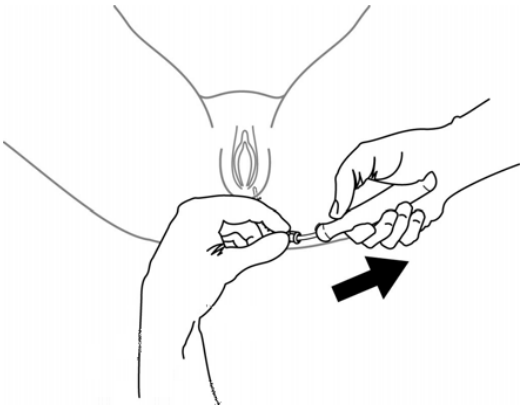
Posterior incision

The Cannula-equipped Guide is inserted into the incision, passed through the buttocks, and continued below the plane of the levator ani muscle, constantly controlled by the fingers within the vaginal dissection. The rectum should be pulled back and kept at a distance, either manually, or by using a retractor to prevent damage from the device.



Insert Cannula-equipped Guide

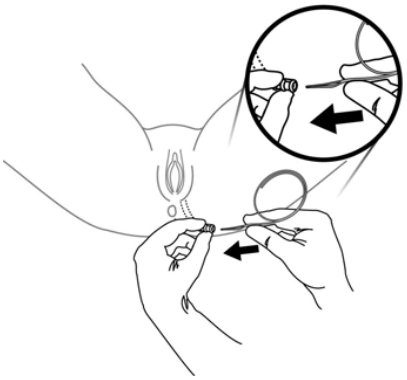
The Cannula-equipped Guide is advanced until it is in contact with the inferior side of the sacrospinous ligament approximately 3-4 cm medial to the ischial spine. It is then pushed through the sacrospinous ligament under digital control, thus exposing the tip of the Guide and Cannula. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. Care should be taken to keep the Cannula in position as the Guide is withdrawn to ensure that the tip of the Cannula remains extended out of the tissue passage and the Cannula is not advanced further into the patient.



Remove Guide and leave Cannula

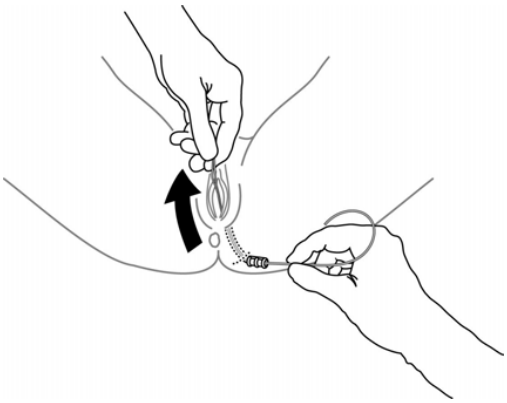
Once the Guide has been removed from the cannula, do not attempt to reinsert. Instead, remove the Cannula from the patient, reinstall the Guide, and then reinsert the Cannula into the patient.

Following placement of the Cannula, the Retrieval Device is passed down and advanced out of the distal end of the Cannula.



Pass Retrieval Device

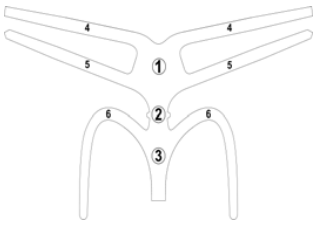
The looped end of the Retrieval Device is then retrieved through the vaginal dissection and pulled out of the vagina with an instrument or a finger.



Retrieve the Retrieval Device

The proximal end of the Retrieval Device can then be passed through the loop and secured to the drape or a retractor with a hemostat, thus reserving the Retrieval Device for later use in pulling the Total Implant strap into position. Optionally, the Cannulas may also be secured when placed in order to limit movement as the other Cannulas are installed. Care should be taken to avoid movement of the Cannulas following placement.

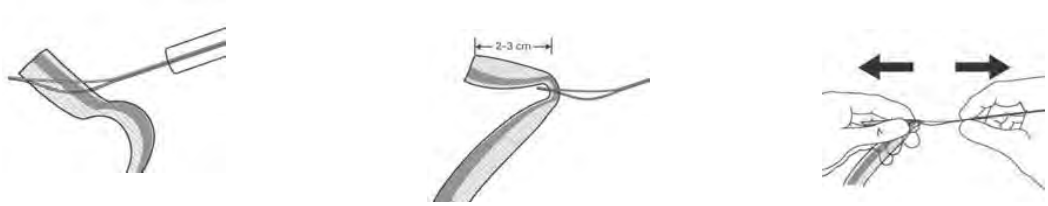
An alternative approach is to directly fixate the Posterior Segment straps (6) to the superficial aspect of the sacrospinous ligament. This can be accomplished by trimming the distal portion of these straps to the proper length and performing fixation with suture or alternative fixation means.



Straps (6) of Posterior Segment

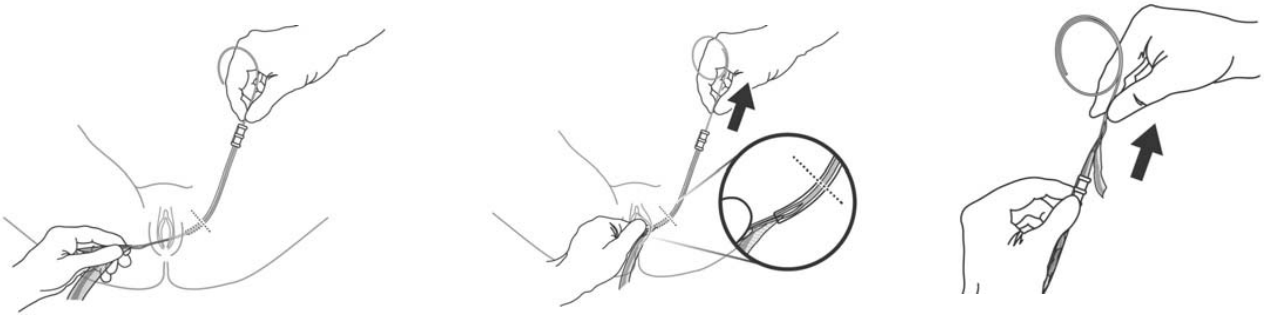
Placement of the Total Implant

Anterior Segment Placement
Placement of the Total Implant starts anteriorly. The distal ends of the Total Implant straps are sequentially captured in the loops at the end of the Retrieval Devices.



Capture distal ends

The loops are then pulled through the Cannulas to the proximal exit. The ends of the straps of the Anterior Segment are uniquely shaped with the superficial straps having squared ends and the deep straps having triangular ends.



Pull loops through Cannula

Optimally, the Anterior Segment of the Total Implant will be positioned tension-free under the bladder while ensuring lateral contact against the ATFP. Lateral contact of the Total Implant to the ATFP should be carefully verified.

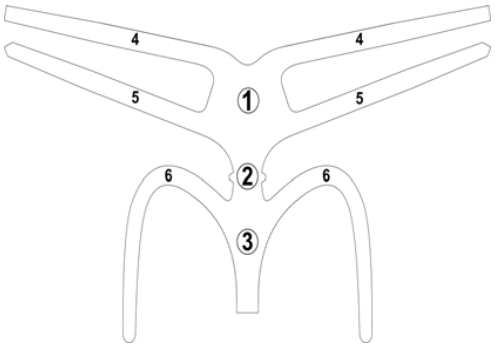
If required, small reductions in the dimensions of the Total Implant to ensure proper fit should be performed at this point.

Further fine adjustment of the tension and position of the Total Implant may be performed following closure of the vaginal incisions at the end of the procedure.

Fixing the Total Implant at each of the pubic insertions of the puborectalis muscle with sutures is optional. If the surgeon elects to do this, it is essential that the anterior notch of the Total Implant leaves the neck of the bladder largely free. Additional fixations remain optional.

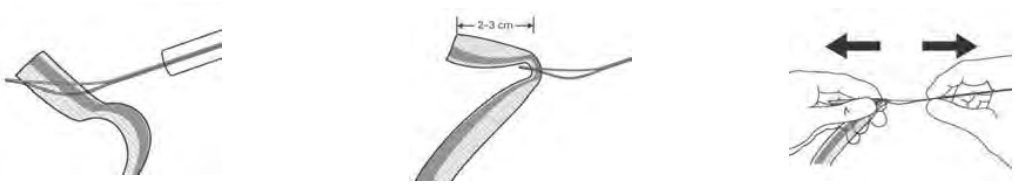
In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh, it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

Middle Segment Placement
The Middle Segment (2) of the Total Implant should be positioned in the posterior dissection behind the vaginal apex. The uterosacral ligaments or other elements of the cardinal ligament complex can be either interposed between the Total Implant and the vagina or attached to the edges of the Total Implant according to surgeon's preference.



Middle Segment (2) of Total Implant

Posterior Segment Placement
Installation of the Posterior Segment of the Total Implant requires the distal ends of the straps to be sequentially captured in the loops at the end of the Retrieval Devices.



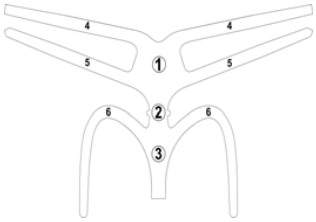
Capture distal ends

The loops are then pulled through the Cannulas to the proximal exit. The Posterior Segment can be positioned once both straps have been retrieved.

Optimally, the Posterior Segment of the Total Implant will be positioned tension-free above the rectum with its lateral edges against the superior surface of the levator ani muscles. Minor reductions in Total Implant length should be made at this point, if required, to ensure proper fit. If desired, sutures may be used bilaterally on the levator ani muscles at the external edge of the Total Implant to ensure aid in positioning.

Further fine adjustment of the tension and position of the Total Implant may be performed following closure of the vaginal incisions at the end of the procedure.

An alternative approach to fixation of the Posterior Segment is to directly fixate the straps (6) to the superficial aspect of the sacrospinous ligament. This can be accomplished by trimming the distal portion of the straps (6) to the proper length and fixating with suture or other alternative means.



Straps (6) of Posterior Segment

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh, it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

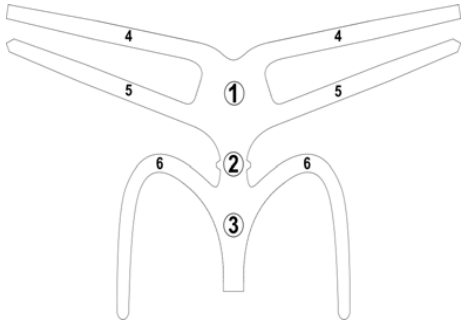
Vaginal Closure and Final Adjustment
Closure of the vaginal incisions can be made according to surgeon's preference. The straps should be used to make any required additional fine adjustment to the Total Implant position, taking care to not place the mesh under tension. The Cannulas can be withdrawn once the Total Implant is properly positioned. The ends of the Total Implant straps extending out of the cutaneous incisions should be trimmed at the level of the dermis. These incisions are closed according to surgeon's preference.

Total Repair with Uterine Preservation

Surgeon's preference and the patient's needs will determine if a concurrent hysterectomy is required. If the uterus is maintained, the following information includes important differences of the procedure previously described.

Implant Preparation

The Total Implant must be cut at the midpoint of the Middle Segment (2).



Middle Segment (2) of Total Implant

Anterior Vaginal Incision

The recommended incision for this repair is a sagittal colpotomy starting 1 cm below the cervix and ending approximately 1 cm from the bladder neck. Alternatively, a transverse incision could be used.

Anterior Mesh Fixation

The posterior part of the Anterior Segment should be attached to the anterior face of the uterine isthmus about 2 cm above the cervix with a single stitch of PROLENE suture.

Posterior Vaginal Incision

The recommended incision for this repair is a sagittal colpotomy of the lower half of the vagina ending at the vulva. Alternatively, the dissection could be performed through a transverse incision of the perineum made at the junction of the perineal skin and the vagina. If a perineal repair is indicated, a diamond-shaped incision overlapping the lower half of the sagittal colpotomy and the posterior perineum is recommended.

Posterior Mesh Fixation

The anterior portion of the Posterior Segment is attached to the posterior face of the uterine isthmus about 2 cm above the cervix with a single stitch of PROLENE suture.

Total Repair in Case of Previous Hysterectomy

The following details important differences associated with women who have had a prior hysterectomy.

Vaginal Incision

The recommended incision for this repair is a sagittal colpotomy starting about 1 cm above the vaginal scar and ending approximately 1 cm from the bladder neck. Alternatively, a transverse incision could be used.

Mesh Fixation

Generally, there is no structure that can readily be identified for attachment to the central region of the implant. If the uterosacral ligaments exist, they can be used in the same way as previously described.

Total Repair in the Absence of a Posterior Defect (Anterior / Apical Repair)

When the patient presents the association of a cystocele and a hysterocele or a vaginal vault prolapse but no significant posterior defect (rectocele), the PROLIFT Total Pelvic Floor Repair kit may also be used to perform a combination anterior/apical repair.

This repair is accomplished by the following:

- Performing the required anterior and posterior incisions and dissection
- Removing the unneeded lower part of the Posterior Segment of the Total Implant (straps must be left intact)
- Placing the Anterior Segment per standard procedures
- Placing and fixing the Middle Segment per standard procedures
- Securing the straps of the abbreviated Posterior Segment to or through the sacrospinous ligament as previously described

The suspension of the uterus (in case of uterine preservation) or the vaginal vault (in case of concomitant or previous hysterectomy) relies on the Posterior Segment of the Total Implant.

In case of uterine conservation, the anterior part of the Posterior Segment of the Total Implant is attached to the posterior face of the uterine isthmus about 2 cm above the cervix with a single stitch of non absorbable monofilament suture.

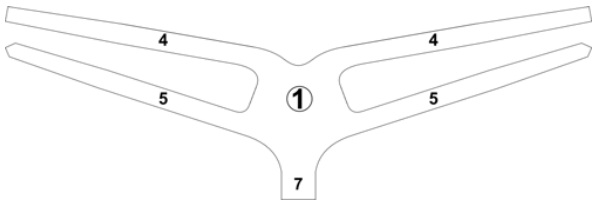
Anterior Repair with Hysterectomy

Vaginal Incision and Hysterectomy
A standard vaginal hysterectomy is performed through a pericervical incision. It is recommended that users identify and retain the uterosacral ligaments or other elements of the cardinal ligament complex. These structures can later be interposed between the Anterior Implant and the vagina or attached to the edges of the Anterior Implant according to surgeon's preference. Care must be taken to close the peritoneum.

The next steps will ideally be performed without any complementary sagittal incision whenever possible. Alternatively, a sagittal anterior colpotomy starting at the vaginal incision and ending approximately 1 cm from the bladder neck could be used if needed.

Anterior Dissection
Grasp and maintain control of the anterior vaginal wall with a series of three atraumatic forceps. Perform a dissection of the entire thickness of the anterior vaginal wall. It is preferred to leave Halban's fascia (pubocervical fascia) on the vaginal wall. Dissection begins from the vaginal incision and should continue up to a point approximately 3-4 cm from the urinary meatus, in order to preserve and protect the region of the bladder neck.

Dissect the bladder laterally up to the vaginal cul de sac. When a defect exists, a finger will easily penetrate the paravesical fossa (paravaginal space). If no defect is evident, an orifice must be created in the fascia using blunt dissection techniques. This dissection is the starting point for a broad lateral dissection of the bladder, which will make it possible to identify the whole length of the arcus tendineus fascia pelvis (ATFP), which extends from the posterior aspect of the pubic arch to the ischial spine. If the ATFP cannot easily be identified, then palpation via a finger in the vagina from the pubic arch to the ischial spine should be used to ensure that straps 4 and 5 of the Anterior Implant pass through at this level.



Anterior Implant

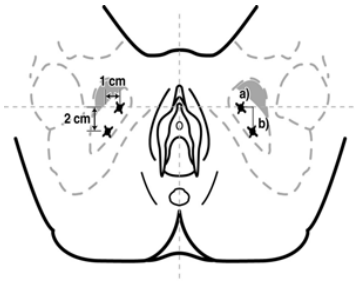
At this point, if required, plication of the bladder is performed in order to reduce the cystocele.

Preparation for Placement of the Anterior Implant

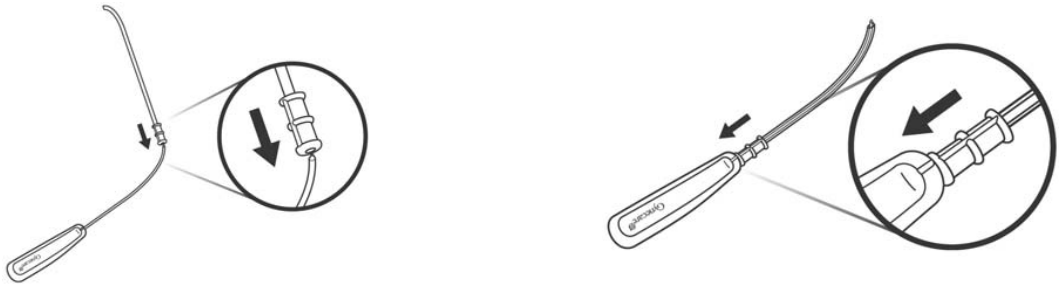
The following should be performed on the patient's left and right.

The Superficial Straps

The limits of the obturator foramen are identified by palpation between the thumb and index finger of the obturator membrane where it comes into contact with the bony boundaries. The cutaneous incision for passage of the superficial strap (4) of the Anterior Implant is made in the anteromedial edge of the obturator foramen, at the level of the urethral meatus. A 4 mm incision is made to enable the Guide with the Cannula installed to pass through the skin without tearing. It is helpful to mark the edge of the obturator foramen with a skin marking pen as a guide for the entrance locations.

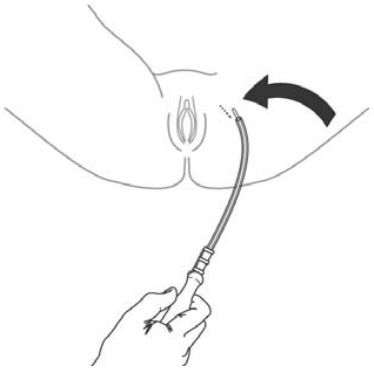


At the start of the passage, the Cannula-equipped Guide will perforate the obturator externus muscle and then the obturator membrane. The device should then be advanced medially through the obturator membrane and pass through the obturator internus muscle approximately 1 cm from the proximal (prepubic) end of the ATFP.



Cannula-equipped Guide

A finger positioned inside the vaginal dissection should always be used to ensure that the device follows the proper path and to provide protection to the bladder. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. Care should be taken to keep the Cannula in position as the Guide is withdrawn to ensure that the tip of the Cannula remains slightly extended out of the tissue passage and the Cannula is not advanced further into the patient.

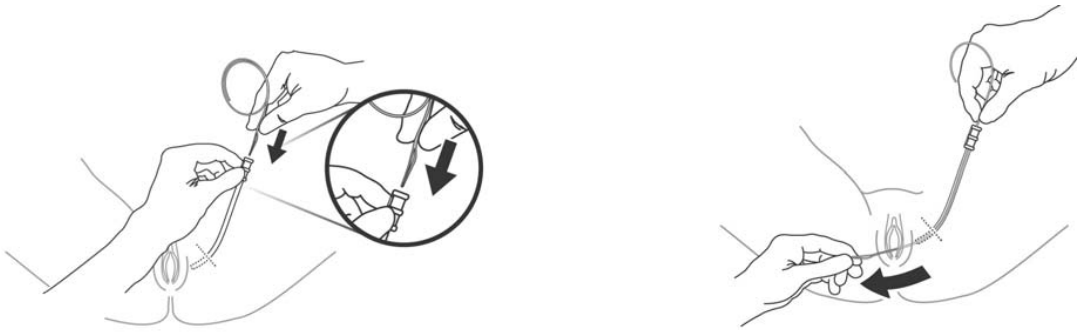


Passage of Cannula-equipped Guide

Remove Guide and leave Cannula

Once the Guide has been removed from the cannula, do not attempt to reinsert. Instead, remove the Cannula from the patient, reinstall the Guide, and then reinsert the Cannula into the patient.

Following placement of the Cannula, the Retrieval Device is passed down and advanced out of the distal end of the installed Cannula. The looped end of the Retrieval Device is then retrieved through the vaginal dissection and pulled out of the vagina with an instrument or a finger.

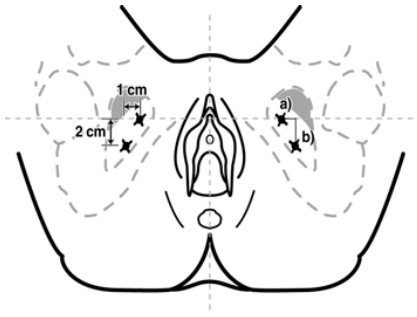


Pass Retrieval Device

The proximal end of the Retrieval Device can then be passed through the loop and secured to the drape or a retractor, thus reserving the Retrieval Device for later use in pulling the Implant strap into position. Optionally, the Cannulas may also be secured when placed in order to limit movement as the other Cannulas are installed. Care should be taken to avoid movement of the Cannulas following placement.

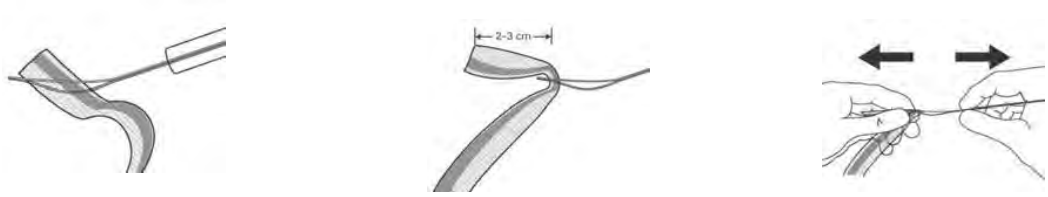
The Deep Straps

For placement of the deep strap (5) of the Anterior Implant, a second cutaneous incision is made 1 cm lateral and 2 cm below the preceding incision at the posterolateral edge of the obturator foramen. To provide protection of the bladder, a Breisky or similar long retractor may be placed in the dissection. The Guide and Cannula are then inserted through the obturator externus muscle and then through the obturator membrane. The device should follow a downward trajectory once it passes through the obturator membrane. This movement will enable the Cannula-equipped Guide to emerge through the obturator internus muscle at the bottom of the paravesical fossa behind the ATFP, approximately 1 cm from the ischial spine.



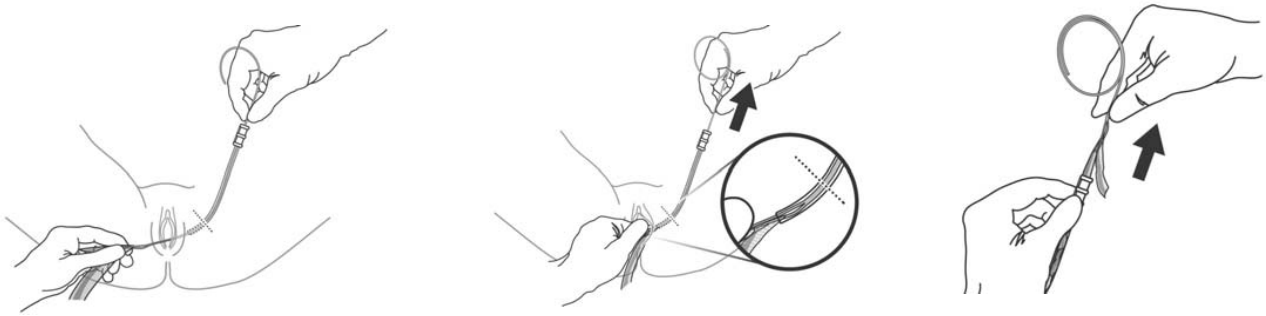
A finger positioned inside the vaginal dissection should be used to ensure that the Guide follows the proper path and to provide protection to the bladder. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. The Retrieval Device is then installed and secured as described above.

Placement of the Anterior Implant
The distal ends of the Anterior Implant straps are sequentially captured in the loops at the end of the Retrieval Devices.



Capture distal ends

The loops are then pulled through the Cannulas to the proximal exit. The ends of the straps of the Anterior Implant are uniquely shaped with the superficial straps having squared ends and the deep straps having triangular ends.



Pull loops through Cannula

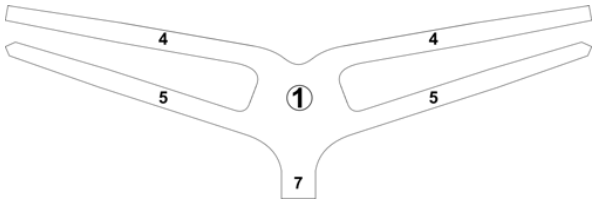
The Anterior Implant can be carefully positioned once all straps have been retrieved. Optimally, the Anterior Implant will be positioned tension-free under the bladder while ensuring lateral contact against the ATFP. Lateral contact of the Anterior Implant to the ATFP should be carefully verified. If required, small reductions in the dimensions of the Anterior Implant to ensure proper fit should be performed at this point.

Further fine adjustment of the tension and position of the Anterior Implant may be performed following closure of the vaginal incisions at the end of the procedure.

Fixing the Anterior Implant at each of the pubic insertions of the puborectalis muscle with sutures is optional. If the surgeon elects to do this, it is essential that the anterior notch of the Anterior Implant leaves the neck of the bladder largely free.

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

The Posterior Tail (7) of the Anterior Implant can be left free, positioned under the inferior margin of the bladder, or attached to the parametrial / cardinal or uterosacral ligaments according to the surgeon's preference. Additional fixations remain optional.



Posterior Tail (7) of Anterior Implant

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

Vaginal Closure and Final Adjustment

Closure of the vaginal incisions can be made according to surgeon's preference. The straps should be used to make any required additional fine adjustment to implant position, taking care to not place the mesh under tension. Following proper positioning, the Cannulas can be carefully withdrawn.

The ends of the Anterior Implant straps extending out of the cutaneous incisions of the obturator foramen should be trimmed at the level of the dermis. These incisions are then closed according to surgeon's preference.

Anterior Repair with Uterine Preservation

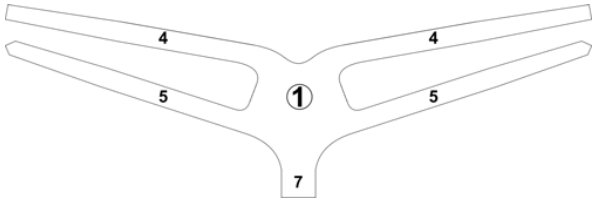
The following includes important differences associated with the procedure when the uterus is preserved:

Anterior Vaginal Incision

The recommended incision for this repair is a sagittal colpotomy starting 1 cm below the cervix and ending approximately 1 cm from the bladder neck. Alternatively, a transversal incision could be used.

Anterior Mesh Fixation

The Posterior Tail (7) of the Anterior Implant is attached to the anterior face of the uterine isthmus about 2 cm above the cervix with a single stitch of PROLENE suture.



Posterior Tail (7) of Anterior Implant

Posterior Repair with Hysterectomy

Vaginal Incision and Vaginal Hysterectomy
A standard vaginal hysterectomy is performed through a pericervical incision. It is recommended that users identify and retain the uterosacral ligaments or other elements of the cardinal ligament complex. These structures can later either be interposed between the Posterior Implant and the vagina or attached to the edges of the Posterior Implant according to surgeon's preference. Care must be taken to close the peritoneum.

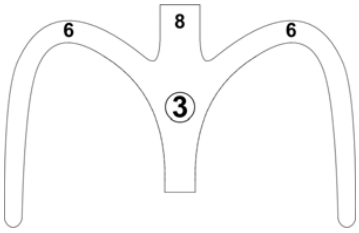
Posterior Vaginal Incision
The recommended incision for this repair is a complementary sagittal colpotomy of the lower / distal half of the vagina ending at the vulva. Alternatively, the dissection can be performed through a complementary transverse incision made at the junction of the perineal skin and the vagina. If a perineal repair is indicated, a diamond-shaped incision overlapping the lower half of the sagittal colpotomy and the posterior perineum is recommended.

Posterior Dissection
Care should be taken to accomplish separation of the rectum from the entire thickness of the vagina. Perform a dissection of the entire thickness of the posterior vaginal wall. Dissection starts from the vaginal incision and should be continued up to the apex of the vagina. Laterally, the dissection opens the pararectal spaces and follows the space between the rectum and the levator ani muscle until the sacrospinous ligament can be palpated. Generally, this dissection allows placement of a tool such as a Breisky retractor or other such instrument which will be useful during later activities. Further deep dissection should then be performed on both sides to expose or palpate the distal part of the sacrospinous ligament at the level of the ischial spine.

At this point, if required, a plication of the prerectal fascia in order to reduce the rectocele should be performed. Any required reductions of enteroceles should also be done at this time.

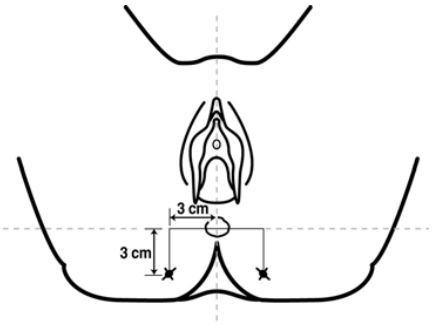
Preparation for Placement of the Posterior Implant
Two approaches for fixating the Posterior Implant are suggested.

Transgluteal Fixation
The straps of the Posterior Implant are passed transgluteally and secured by passage of the straps through the sacrospinous ligament and coccygeus muscle.



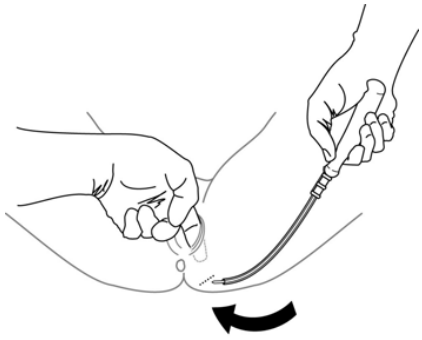
Posterior Implant

To accomplish this, a 4 mm cutaneous incision is made approximately 3 cm lateral and 3 cm down from the anus. If desired, sterile packing coated with lubricant may be inserted into the rectum first to ensure better appreciation of the position of the rectal ampulla.



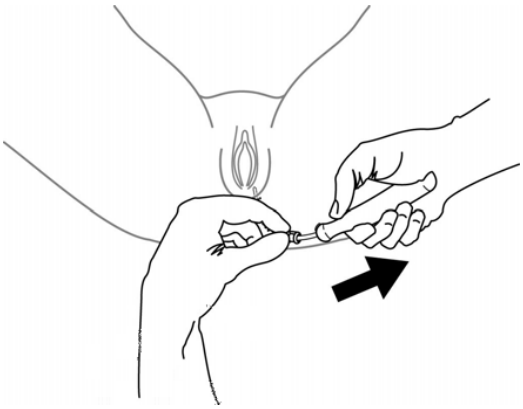
Posterior Incision

The Cannula-equipped Guide is inserted into the incision, passed through the buttocks, and continued below the plane of the levator ani muscle, constantly controlled by the fingers within the vaginal dissection. The rectum should be pulled back and kept at a distance, either manually, or by using a retractor to prevent damage from the device.



Insert Cannula-equipped Guide

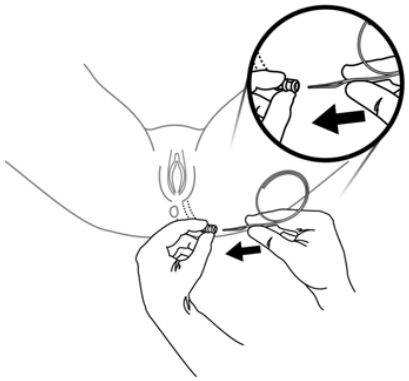
The device is advanced until it is in contact with the inferior side of the sacrospinous ligament approximately 3-4 cm medial to the ischial spine. The device is pushed through the sacrospinous ligament under digital control, thus exposing the tip of the Guide and Cannula. Once the distal tip of the Guide and Cannula exit the vaginal dissection, the Guide is removed, leaving the Cannula in place. Care should be taken to keep the Cannula in position as the Guide is withdrawn to ensure that the tip of the Cannula remains extended out of the tissue passage and the Cannula is not advanced further into the patient.



Remove Guide and leave Cannula

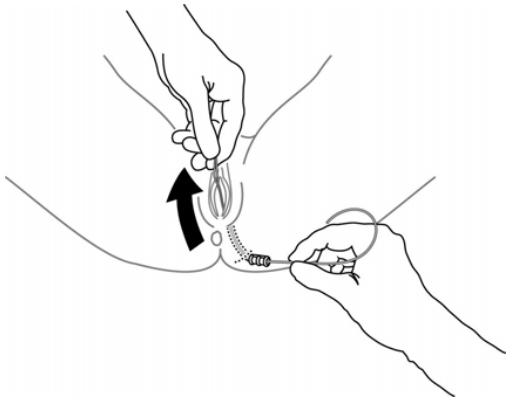
Once the Guide has been removed from the cannula, do not attempt to reinsert. Instead, remove the Cannula from the patient, reinstall the Guide, and then reinsert the Cannula into the patient.

Following placement of the Cannula, the Retrieval Device is passed down and advanced out of the distal end of the Cannula.



Pass Retrieval Device

The looped end of the Retrieval Device is then retrieved through the vaginal dissection and pulled out of the vagina with an instrument or a finger.

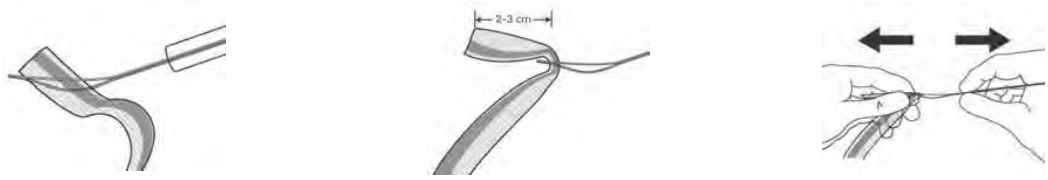


Retrieve the Retrieval Device

The proximal end of the Retrieval Device can then be passed through the loop and secured to the drape or a retractor with a hemostat, thus reserving the Retrieval Device for later use in pulling the Posterior Implant strap into position. Optionally, the Cannulas may also be secured when placed in order to limit movement as the other Cannulas are installed. Care should be taken to avoid movement of the Cannulas following placement.

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

Placement of the Posterior Implant
To install the Posterior Implant, the distal ends of the straps are captured in the loops at the end of the Retrieval Devices. The loops are then pulled through the Cannulas to the proximal exit.

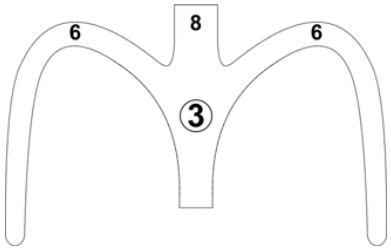


Capture distal ends

The Posterior Implant can be positioned once both straps have been retrieved. Optimally, the Posterior Implant will be positioned tension-free above the rectum with its lateral edges against the anterior face of the levator ani muscles.

Minor reductions in Posterior Implant length should be made at this point to ensure proper fit. If desired, sutures may be used bilaterally on the levator ani at the external edge of the Posterior Implant to ensure aid in positioning. A further fine adjustment of the tension and position of the Posterior Implant may be performed following closure of the vaginal incisions at the end of the procedure.

Alternatively, the straps (6) of the Posterior Implant may be fixated directly to the superficial aspect of the sacrospinous ligament. This can be accomplished by trimming the distal portion of these straps to the proper length and performing fixation with suture or alternative fixation means.



Posterior Implant

The Anterior Segment (8) of the Posterior Implant can be left free, or positioned above the Pouch of Douglas, or attached to the cardinal or uterosacral ligaments according to the surgeon's preference.

In the event that sutures, staples, or other fixation devices are used in conjunction with the mesh it is recommended that they be placed at least 6.5 mm (1/4") from the edge of the mesh.

Vaginal Closure and Final Adjustment
Closure of the vaginal incisions can now be made according to surgeon's preference. The straps should now be used to make any required additional fine adjustment to the Posterior Implant position, taking care to not place the mesh under tension. Following proper positioning, the Cannulas can be carefully withdrawn.

The ends of the straps extending out of the cutaneous incisions of the obturator foramen should be trimmed at the level of the dermis. These incisions are then closed according to surgeon's preference.

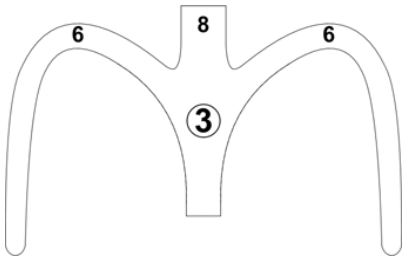
Posterior Repair with Uterine Preservation

The following includes important differences associated with the procedure when the uterus is preserved.

Posterior Vaginal Incision
The recommended incision for this repair is a sagittal colpotomy of the lower half of the vagina ending at the vulva. Alternatively, the dissection could be performed through a transverse incision made at the junction of the perineal skin and the vagina. If a perineal repair is indicated, a diamond-shaped incision overlapping the lower half of the sagittal colpotomy and the posterior perineum is recommended.

Posterior Dissection
The posterior dissection is performed up to the uterine isthmus.

Posterior Mesh Fixation
The Anterior Segment (8) of the Posterior Implant is attached to the posterior face of the uterine isthmus about 2 cm above the cervix with a single stitch of PROLENE suture.



Anterior Segment (8) of Posterior Implant

Associated Procedures
Whenever needed, a perineal repair or a suburethral sling for the treatment of stress urinary incontinence can be performed. The suburethral sling can be passed through the retropubic space or obturator foramen depending on surgeon's preference.

*Tradmark